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Macworld's Sixth Annual
World-Class Awards,
Page 120

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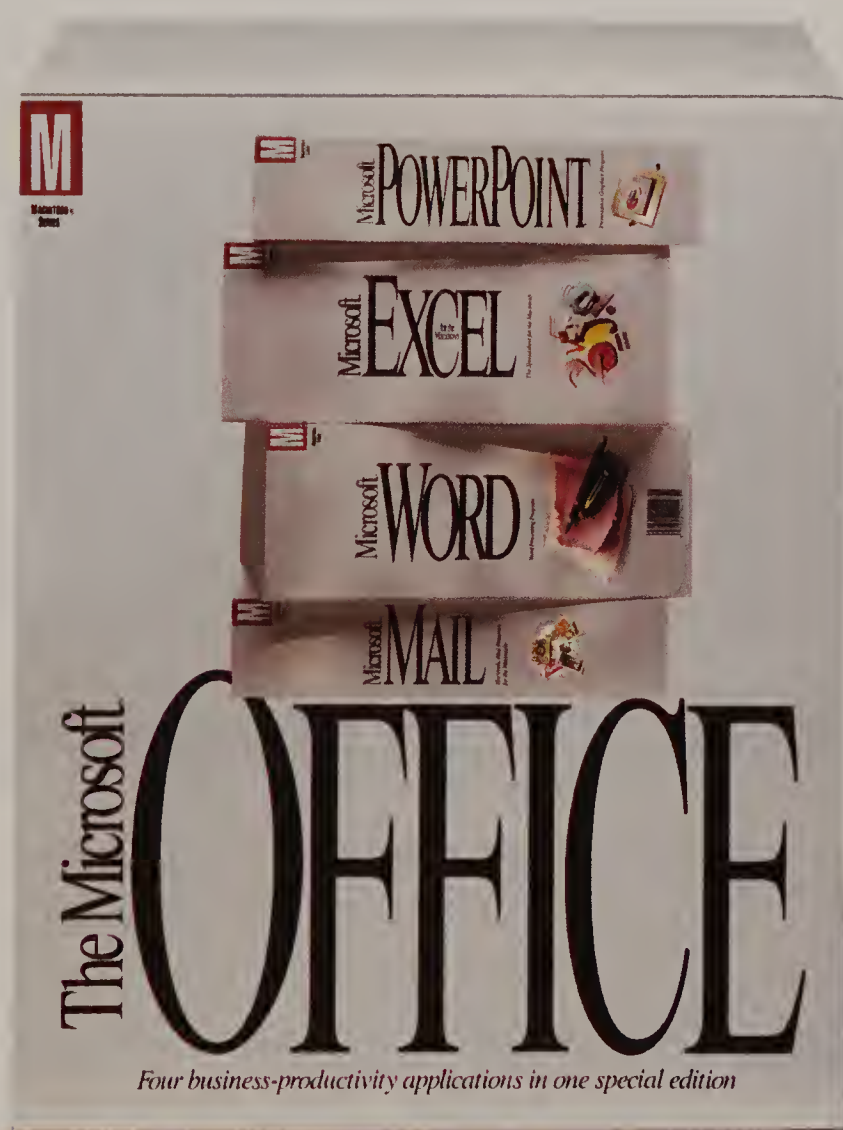
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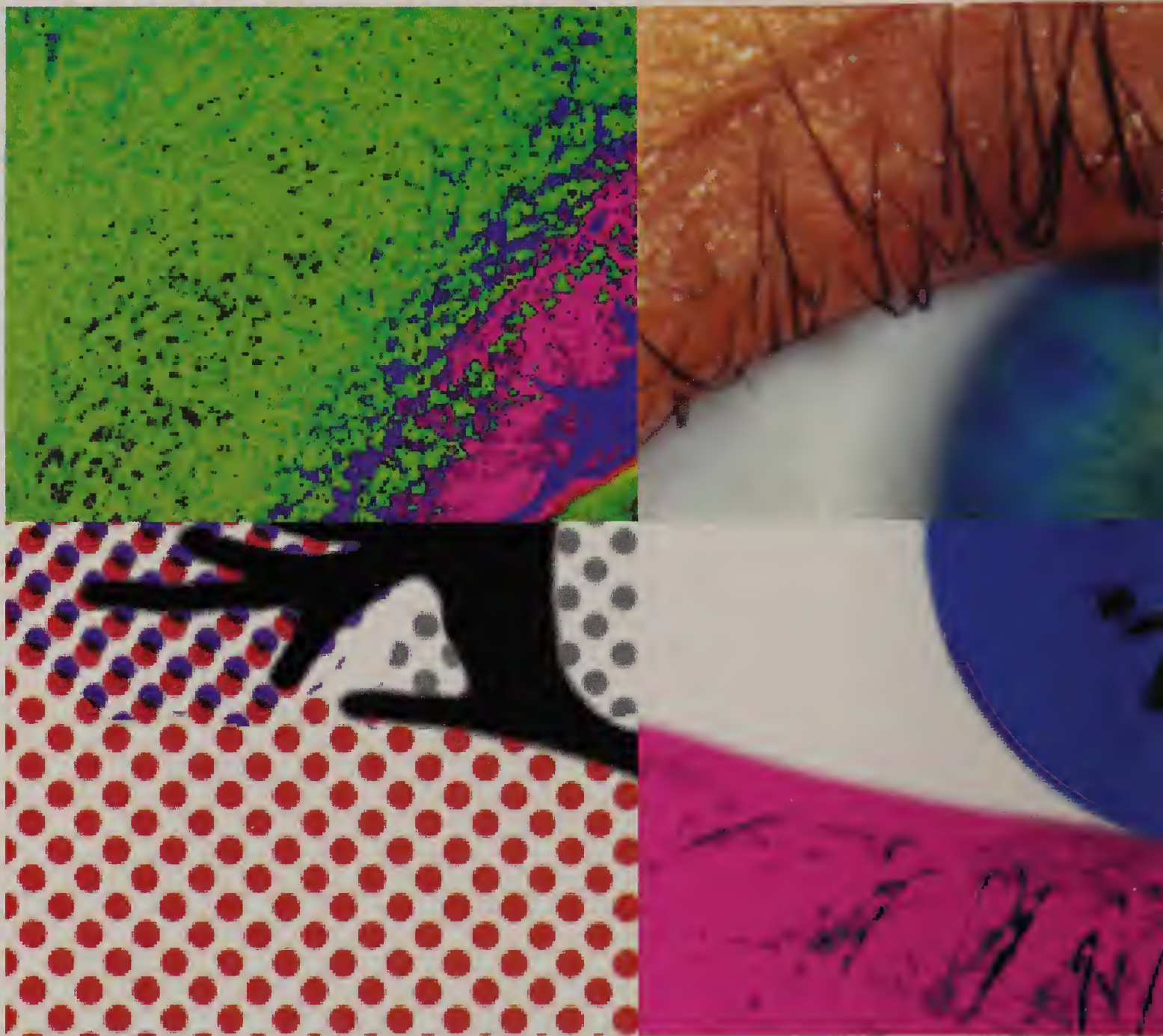
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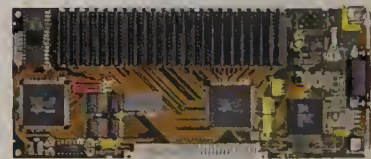
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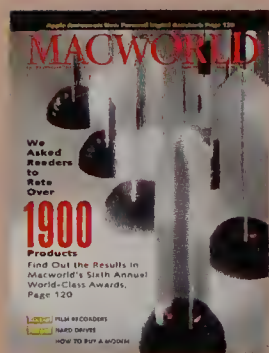
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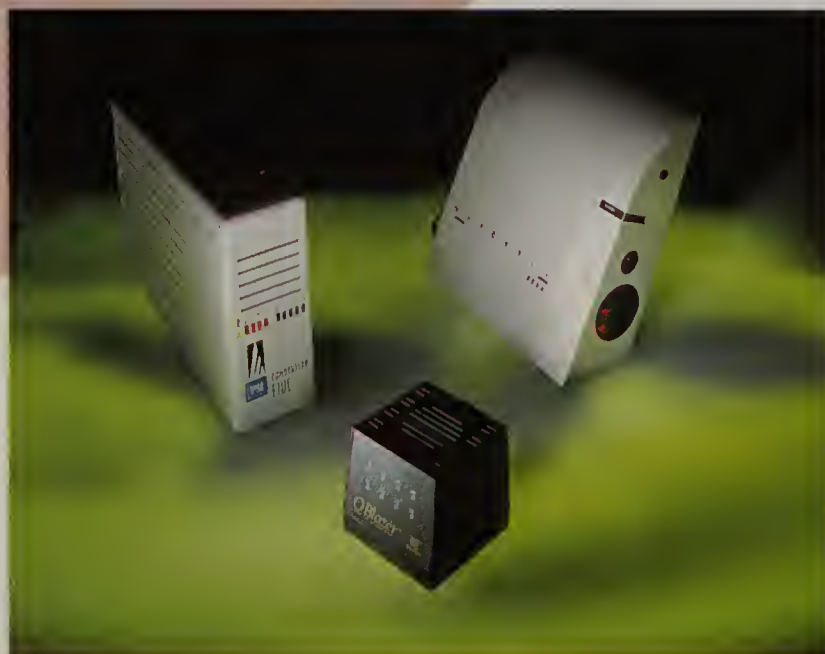
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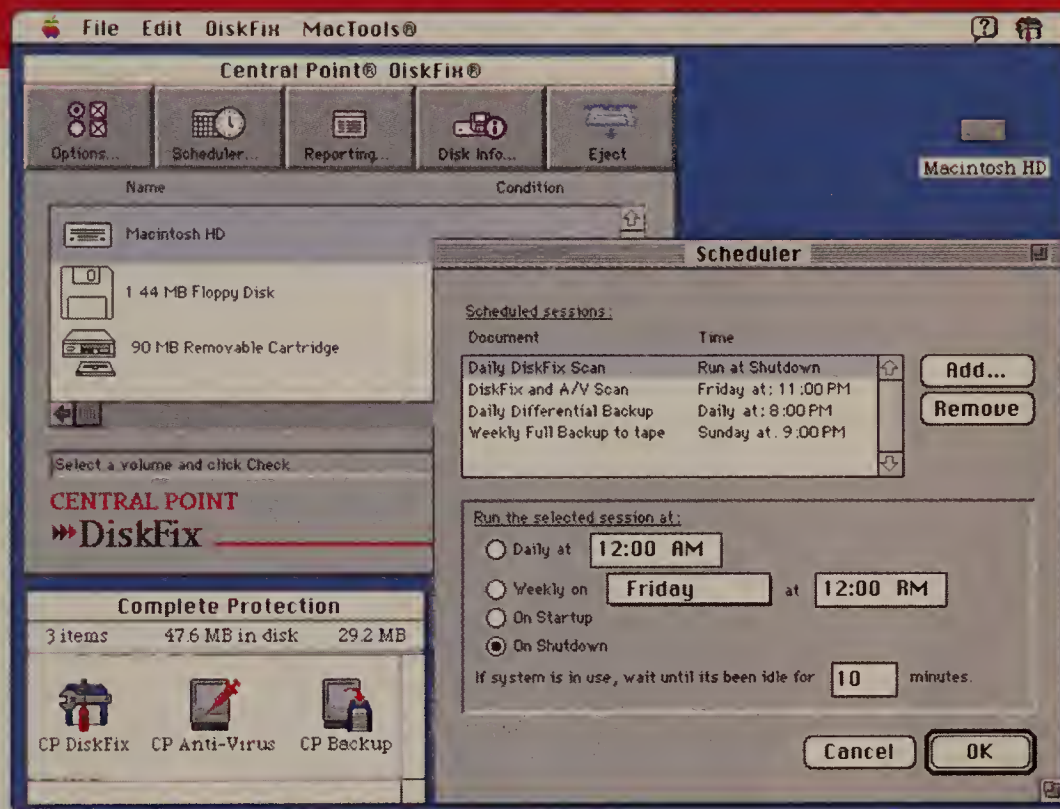
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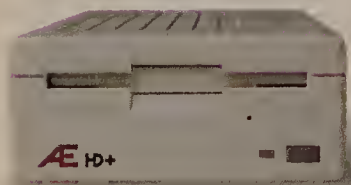
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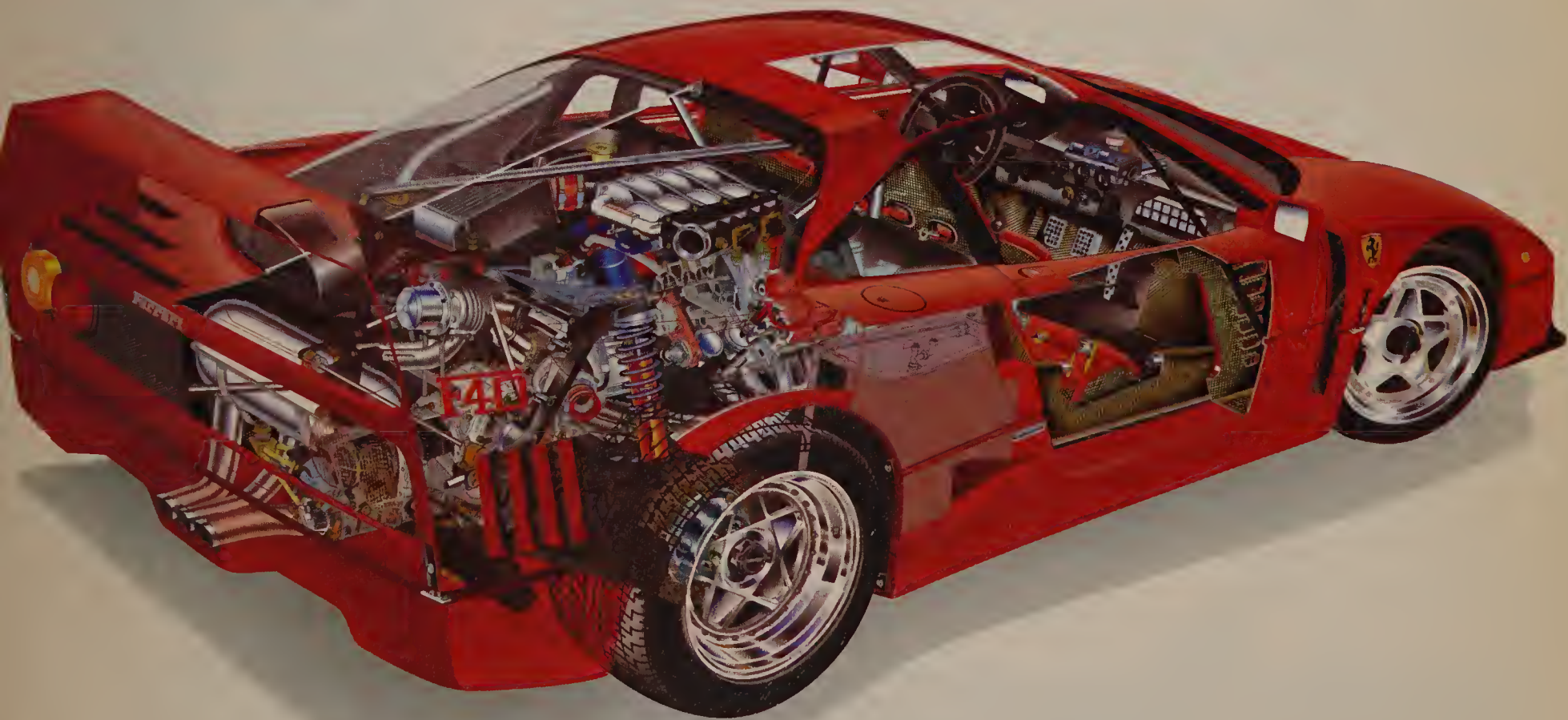
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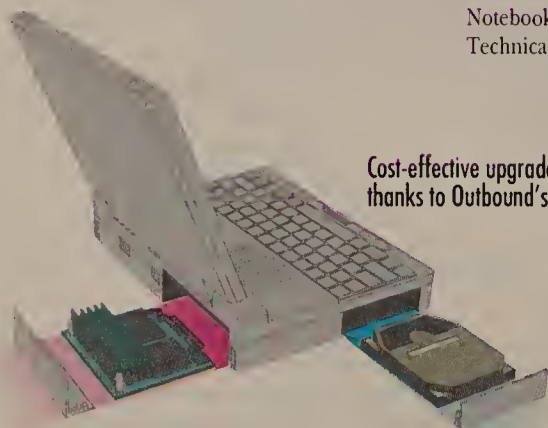
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80 MB	120 MB
No	YES
8 MB	14 MB
Yes	Optional
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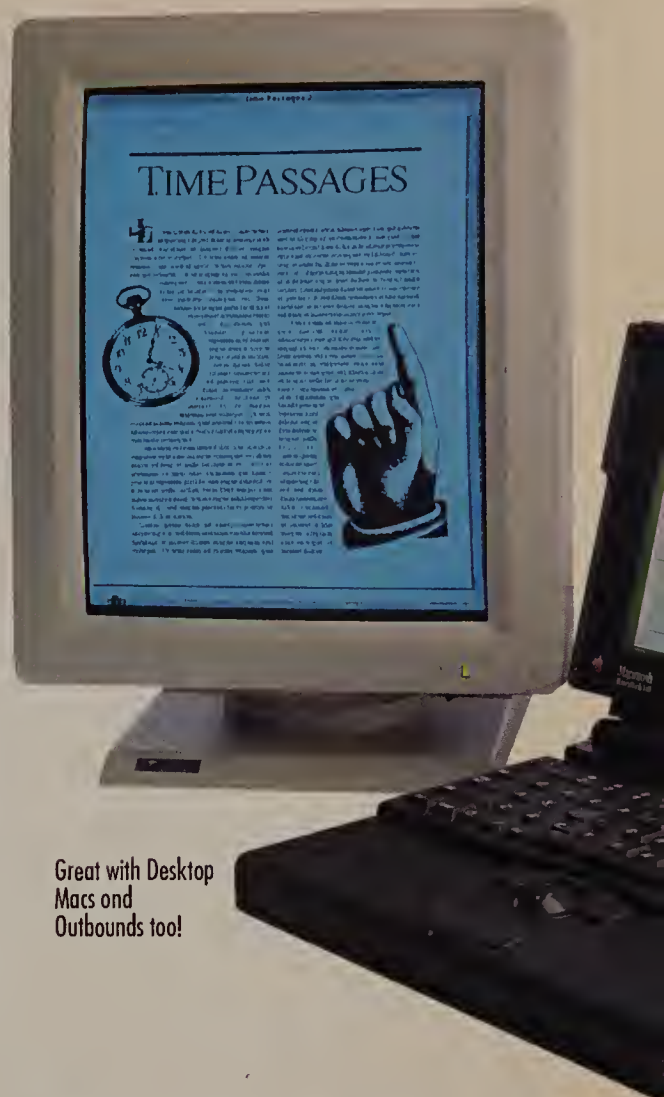
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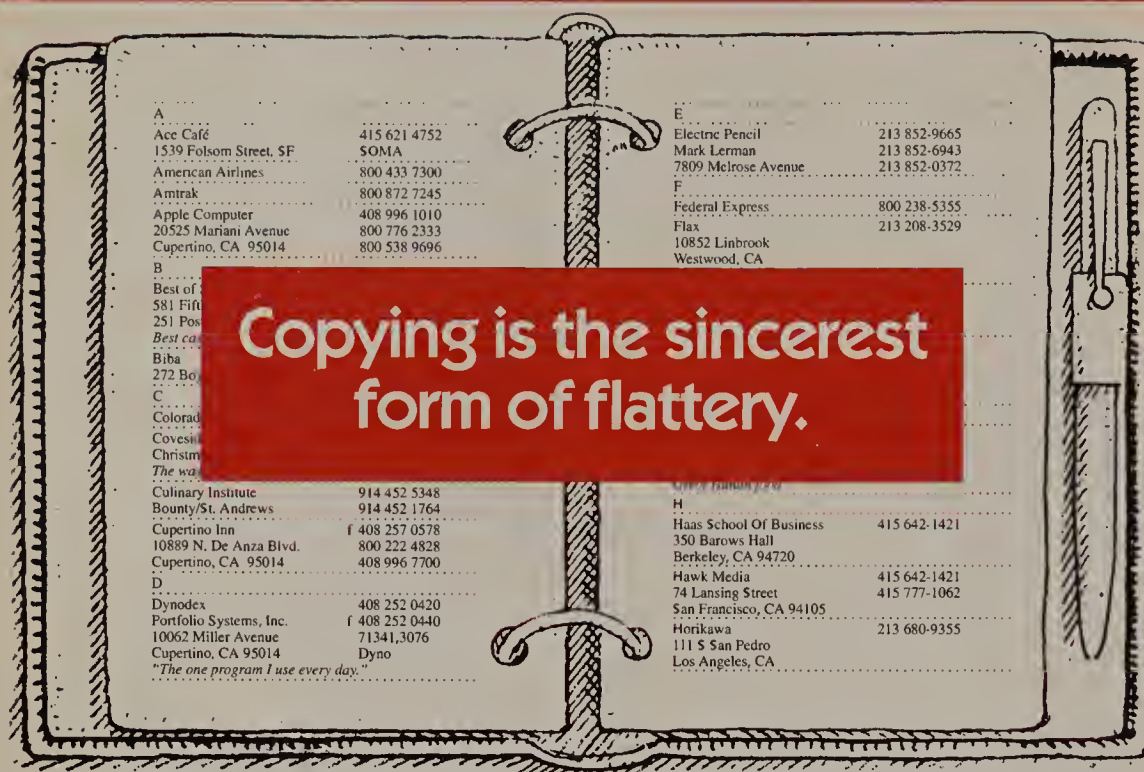
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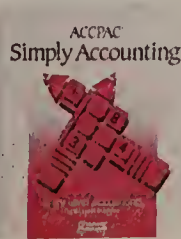
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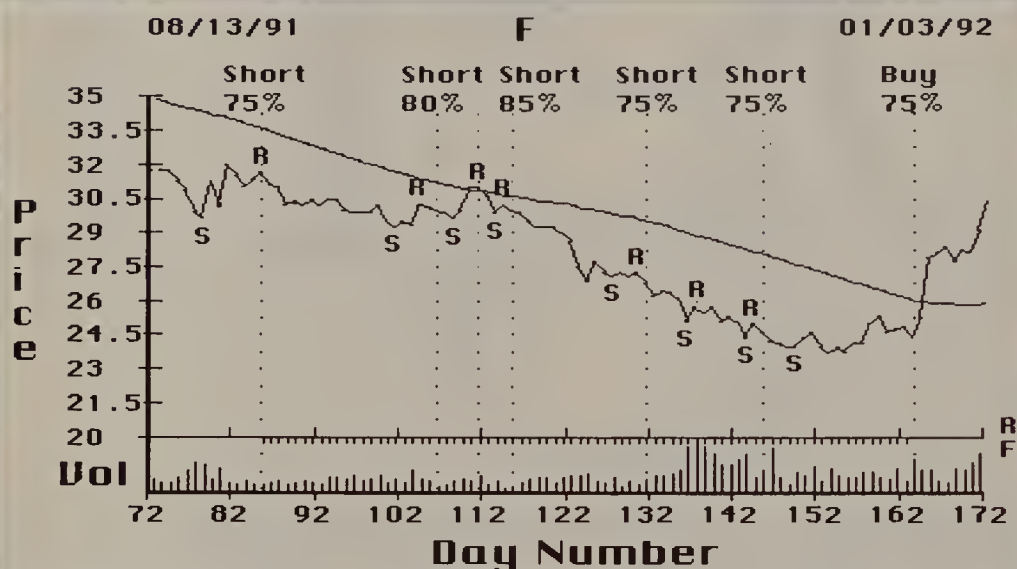


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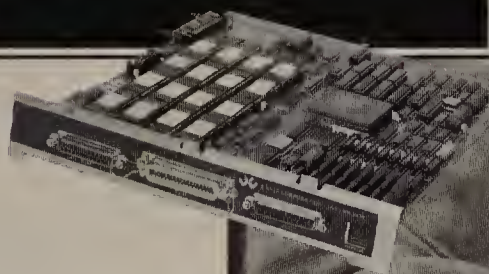
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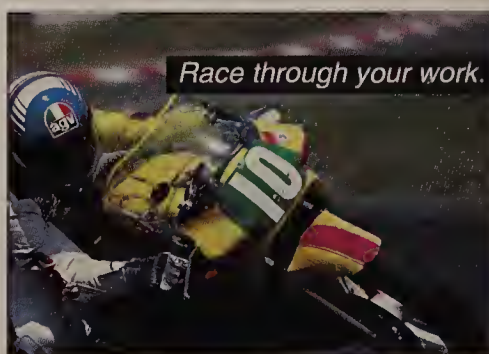
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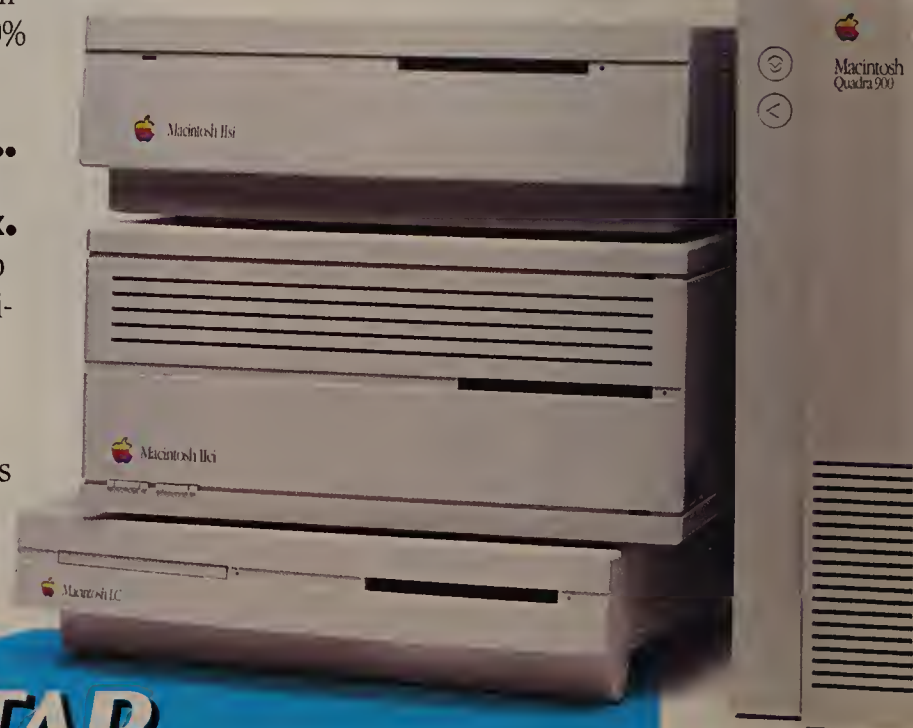
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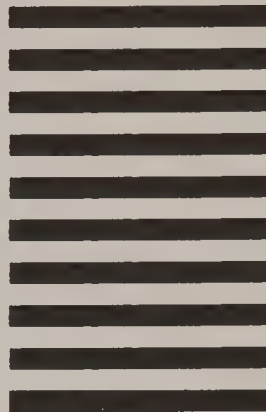
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MacBulletin

L A T E - B R E A K I N G N E W S

New Lawsuit: Quorum is developing software for converting Mac applications to run under Unix (see "Better Than a Mac Clone?" *News, Macworld*, May 1992). Apple accused Quorum of infringing Apple patents; in response, Quorum has filed a preemptive suit against Apple. Stay tuned.

Apple-Approved Translator: Apple and AT&T-owned Echo Logic (908/946-1100) are working on tools similar to the Quorum product (see "New Lawsuit") for translating Mac software to the IBM RISC platform that Apple plans to use in a future Macintosh.

A very fast optical drive from Pinnacle Micro (714/727-3300) uses a faster spin rate and an advanced read-write-head design to achieve average access times and data-transfer rates equivalent to those of hard drives at 19ms. The PMO-650 drive will list for \$3995.

Portfolio Systems (408/252-0420) is working on a new version of the paperless-document utility Glue that won't require using the Chooser and will be able to incorporate a viewer engine in files. Dynodex 3.0 will support Apple events and provide a text editor for memos and mail merges. Prices are not set.

Tiny removable-cartridge drives from SyQuest, the SQ2542A and the SQ3105, are, respectively, a 2.5-inch device that stores 42.8MB and a 3.5-inch device that stores 105MB. The 3.5-inch drives will be used in Mac products expected from third parties by the end of the year.

Centralized Communications: Start-up Atelier Systems (415/285-1233) is developing

Hello, a \$99 modular utility that will make a unified address book available in all telecom software. The first version will provide a text editor and will send fax numbers to a fax modem; later plans call for integration with E-mail and mail- or fax-merge.

The Future of PageMaker: Aldus (206/622-5500) hasn't set a ship date or price, but the next big PageMaker upgrade will be able to rotate text and graphics by tenths of a degree; open multiple documents; and print color separations from within PageMaker.

The Color Pivot/LE from Radius (408/434-1010) is a lower-cost version of the company's Color Pivot monitor, which swivels from portrait to landscape orientation. The Color Pivot/LE lists for \$1199, versus \$1549 for the Color Pivot, but the LE requires an adapter board, while the original works with the built-in video on some Mac models. The Color Pivot/LE is shipping now.

Mac to Tandem: Menlo Business Systems (415/948-7920) has released MacMenlo 4.0, a terminal emulator for Tandem systems running Guardian OS. It is System 7-compatible, provides macros, and supports copy and paste in both directions. MacMenlo lists for \$395.

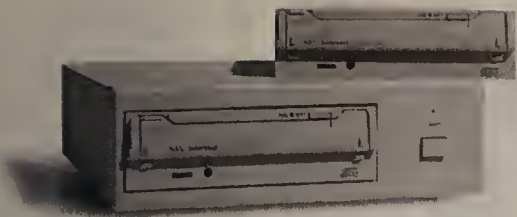
Dove Files Chapter 11: The company is attempting to reorganize and has filed for protection from its creditors.

SGI Supports QuickTime: The leader in 3-D color graphics systems and software, Silicon Graphics, will add QuickTime support to its applications, so they can play and exchange QuickTime movie files with Macs. [m](#)



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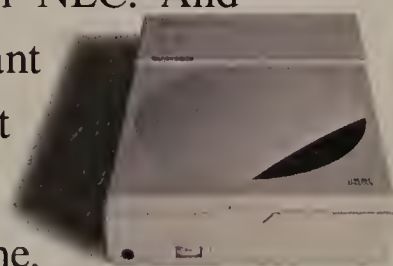
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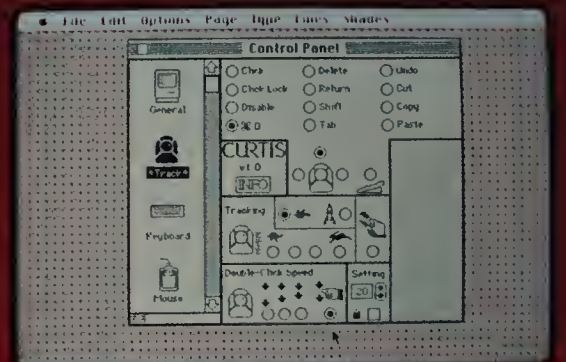
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Product Testing and Late Nights at the Lab: Part 2

BY JERRY BORRELL

LAST MONTH I RAISED SEVERAL questions related to how *Macworld* deals with product-testing. In this column I discuss several more issues. Before going on, it may be helpful for you to understand how we organize our testing. Generally, for each issue we select two or more features that will contain product-testing data from our lab. Typically these are hardware stories. We cover main topics, in several features throughout the year. It might be easier to publish the massive amounts of data we gather on a subject like hard drives or printers in a single feature, and perhaps for marketing purposes it would be more effective. But because our goal is to provide a magazine of the broadest interest to readers, we select two unrelated subjects for lab tests in each issue, rather than focusing on a single topic.

Once we have decided on the topics for a specific issue (such as film recorders and low-capacity hard drives in this issue), the editors, lab staff, and author discuss the scope of each article and the range of products that should be included. For example, the selection of 50MB to 120MB drives for inclusion in the low-capacity drive feature was a matter of long debate. Some editors felt it wasn't meaningful to test low-capacity drives that use virtually identical technology. Another issue is that current 50MB-to-80MB-drive technology will be displaced by a new generation of mechanisms over the next six months, so some editors questioned whether we should review them at all. In the end, the traditional argument prevailed—if customers are buying products, we should test them.

With technology more complex than hard drives, the discussion may be more contentious. For example, an upcoming lab feature will cover slide scanners. Initially that article was to focus on color scanners, but we realized that the topic was too broad for a single feature. We agreed to focus on one subset of scanners (slide and transparency scanners) that we felt was, in terms of technology and reader interest, the one most in need of examination.

Product Testing Cycles

THE PROCESS OF GATHERING PRODUCT information for a feature is not precise, but the following approximates what happens. Once the topic and scope are decided, a staff member searches our database to produce a list of known products in that category. We also sort through files of articles, review press announcements, consult with one another, review online services, pull out notes from product demos, look at ads in magazines, and consult other sources of product information so we can produce as complete a list of products as possible. Frequently we call vendors and ask if they will be making product announcements that will affect the article, asking to sign nondisclosure agreements if necessary to gain advance access to product information.

Given the above as a starting point, assistant editor Suzanne Courteau calls companies and tells them that we would like to obtain products pertinent to an upcoming article. Just trying to get the products we want to review can be a harrowing procedure. It often takes several calls to obtain products from a single manufacturer. In the process of calling manufacturers, we often discover that products, or product families, are being discontinued or being replaced by new products. Thus begins a tango in which we might knowingly test products that may be in the market for only a short while; in which we might discover that a new product or product line is indeed not going to ship on time; or in which we might find that new products promised or already advertised by manufacturers are not ready to ship, let alone be tested.

Worst of all are the late-comers, products that arrive just after we have finished work on one article and begun work on another. Products that have to be dealt with for whatever reason—screwups at the developer, parcels missing in transport, products misplaced, prod-

ucts that arrived broken and had to be exchanged for another, products from companies that no one on staff has heard of, or significant new products that just came through the door. Perhaps inevitably—given the number of products we look at, the complexity of our tests, and the fact that we ship a magazine once a month—some products may be missed. But we try to work closely with developers to ensure that the appropriate products in the market are included in the right articles.

Product Acquisition and Review

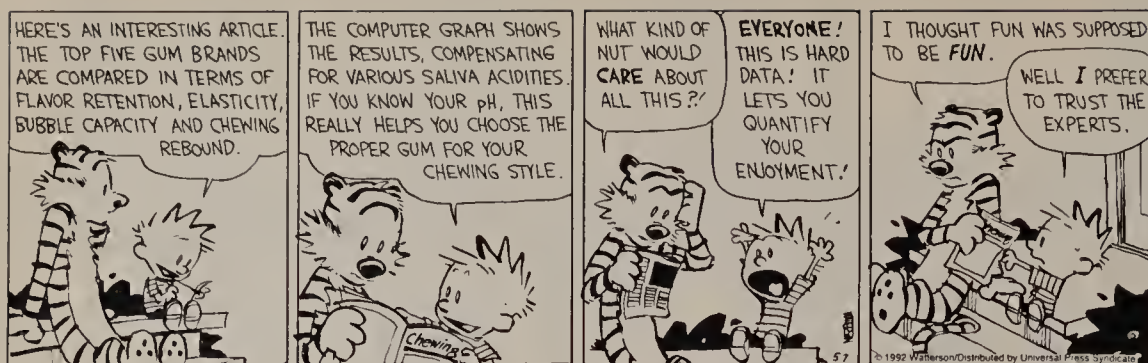
HAVING SETTLED ON A LIST OF PRODUCTS appropriate for an article, we set about acquiring them from the manufacturers. We do not accept beta products for review, but the distinction between a just-about-to-be marketed product and a final prototype apparently isn't always clear to the manufacturers—and that sometimes causes us problems. Many companies tell us that it would be best if we purchased products for testing from sales channels used by all consumers. These companies point out that the loaner system allows companies to "cherry pick" the best units and send them to us, which doesn't fairly represent product lines.

That suggestion raises two issues for *Macworld*. The first is the economic consideration of product purchase. Like car magazines, all of today's computer magazines depend on hardware companies to provide them with review units. Given the number of products that *Macworld* reviews in a year (about 1200 this year alone), we couldn't purchase all of the products that we need to review. Unlike *Consumer Reports* magazine, all computer magazines are for-profit ventures. There is simply no way for us to purchase all the products that we have to test and remain profitable, unless we were to reduce the scope of our product testing drastically.

The second issue, whether



Can
computer
magazines
do what
they
promise?



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er to allow manufacturers to select products they submit for testing, is equally tough. Cherry picking was best defined once by Mike Boich of Radius, who described going onto the manufacturing floor and asking his vice president of manufacturing to select the best product on the line at that time for a magazine. (The response of his VP was pick any one you want, they're all the same.) Over the last several years I've attempted to persuade developers and our staff that the process of developer-driven product submission allows us the opportunity to review the best products that the companies can produce—assuming that manufacturers are honest, that they do not intentionally send us products built to higher specifications than the ones they intend to sell to consumers.

To date, I'm glad to report, not once have we found a manufacturer attempting to do that. In fact, we sometimes find that manufacturers pay all too little attention to the review process, mistakenly sending us old products or products that don't work at all. We sometimes receive products from major manufacturers that are well below the quality of their average products. This happens because some companies create product loan pools for the exclusive purpose of supporting magazine product tests and reviews. We have on occasion received a product so beaten up by review at several magazines that we have to tell the manufacturer that the individual product we have is obviously below the quality of the products they sell.

Product Tracking

IT MAY SEEM TRIVIAL TO BRING UP shipment, receipt of boxes, visual inspection of newly received products, verification of receipt of proper products, logging products into a database, the requisite support tracking, and other issues involved in returning products to vendors—but it's not. These tasks that support our testing require nothing short of a sophisticated warehousing effort. The physical demands alone for a feature such as large color monitors involve a ton or more of products that require significant storage space. Pulling monitors out of their boxes

and plugging them in, just to verify that we have a working product to test at a later date, is a time-consuming process. Such tasks are the hidden part of every test cycle that has slowly built up over the years as product categories have grown, in the case of color monitors, for example, from 8 to 17 to 26 products in an upcoming issue.

We always experience a few surprises in each test cycle. Consider that we may be testing two sets of products at one time, such as monitors and hard drives, that add up to between 60 and 200 products. Another group of products, having been tested, await return to developers; others await a photography session for inclusion in the feature article. And still more groups of products—for example, CD ROM drives and scanners—have begun to arrive for upcoming articles.

It gets a little crazy around here about then. Let's just say that the lab staff begin to look like characters from a grade B science fiction or teen slasher film. You have to wonder if one more product coming in late might just be the one that turns a normally sedate person into a murderous postal worker.

When Do We Get Down to Testing?

IT'S HARD TO BELIEVE, BUT EVENTUALLY we get products lined up on lab benches and start connecting them to computers. Then what?

Well, we test products. But how do we decide what tests we should apply to each category of products? In each instance we develop written guidelines that we call test scripts. The process of development varies, but typically there are discussions among the editors, contributing writers, lab staff, and developers or other knowledgeable third parties. Because we look at similar products each year, we begin with our own experience, but changes in technology dictate that with each testing cycle we must consider changing existing tests or adding new tests. The truth is, no magazine has enough expertise on all products and technologies to allow it to develop completely independent tests. So we look outside for knowledge. Professional associations such as the IEEE (In-

stitute of Electrical and Electronics Engineers), ACM (Association for Computing Machinery), SID (Society for Information Displays), and others have subgroups in many areas of expertise that we learn from. And of course we seek out authors with hands-on experience and technical expertise. But for the most part, it is product developers who are the most help. Many of the larger companies have their own QA (quality assurance) groups that test products. There is much general contact between these engineers and *Macworld* staff. This year we're hosting four specific meetings: on hard drives, printers, networking, and desktop publishing.

What Kinds of Tests?

AS I SAID IN MY COLUMN LAST MONTH, we're attempting to de-emphasize the superfluous parts of the lab process: testing for the sake of testing, considering aesthetic issues, trying to determine how many angels fit on the head of a pin. There is a lot of this sort of thing in computer magazines, and it looks great in three-dimensional charts, but it doesn't have much practical value to our readers when they purchase products.

We used to produce impressive charts that looked good on the page, but didn't give the reader much to take into the computer store. So we've made an effort to improve our charts. In the area of hard drives, for example, we have always focused on real-life or application testing: opening, saving, and closing documents. We added new tests that isolated products from the Mac OS and examined the actual performance of a drive, the physical limits of how quickly data could be written to or read from a hard drive. At that point our testing had become sophisticated enough to show distinctions between classes of technology—if manufacturers were using the same cathode-ray tube in a monitor or the same hard drive mechanism. When our hard drive performance tests show unimportant millisecond differences, we can determine if this reflects common drive mechanisms; when we find greater differences, we can determine whether they reflect different drive mechanisms or companies' varying effectiveness in developing software drivers or in dealing with the overhead of the operating system for the Macintosh. We can produce great engineering analyses of products these days, but the differences we find between many products may not actually be noticeable to the end user, or meaningful. We need to continue to examine these kinds of issues, tracking the differences in types of technology that manufacturers use. But more than ever we *continues*



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question how much detail at that level is appropriate to include in the magazine.

Data Representation

A TOPIC OF FREQUENT DEBATE HERE IS how data should be presented in the magazine's tables and charts. Two years ago we agreed to a standard format for our test results; products run down the vertical axis of a chart and tests run across the horizontal axis. We decided against three-dimensional charts because of the difficulty in

reading them. And we began to simplify our use of color to lessen the visual noise. We continue to debate the issue of the use of color, both in the representation of data and in how to represent aspects of actual color. In a color-monitor feature, for example, how can we best show where the range of colors you see on a monitor falls within a three-dimensional color-space model using a table printed in a two-dimensional magazine based on a color system developed for printing, not monitors?

As tests became more complicated we made the decision to index test results, that is, to establish a benchmark for each test, a fixed data point against which we would show all the results. The result in the magazine was tables that technically oriented readers found useful, but that many readers considered uninterpretable. For readers who could wade into the charts and spend some time studying them, there was information to be gleaned. We questioned whether we were making the magazine too difficult. So we have returned to a simpler format for representing data that we believe is easier to understand. Still, we continue to debate and refine how we create data charts for your use.

Where Are We Headed?

WE WANT TO EMPHASIZE TESTS THAT give the consumer more than speed comparisons. We want to report on compatibility, functionality, reliability, and other issues that you don't typically find out about until you've spent a fortune and brought the product home; these are issues that don't normally show up in tables and charts of performance benchmarks. And like all the testing issues mentioned above, reliability, compatibility, and related issues have their own sets of problems. For example, we want to report on how manufacturers handle technical support, so we are exploring how best to rate such service. For the story on low-capacity hard drives in this issue, we devised three questions to be asked of technical-support personnel. We established a rating system in which manufacturers gained or lost points based on the accuracy, helpfulness, and accessibility of their responses. The result appears on page 137.

Another solution we've come up with is the *Lab Notes* column, which we created to help our readers understand the issues behind the lab testing done each month by our editors and staff.

We have talked about a facility for long-term testing, environmental testing (shock, heat/cold, vibration), and ever more sophisticated benchmarks. The reality is that we'll probably continue to refine our tests in every category, building on our expertise every year, adding scripts that will automate the testing process to the extent possible. We'll continue to debate the best ways to present our results in the magazine, and we'll err on the side of simplicity in the hope that you'll actually want to read our test articles. But don't stop there. Let us hear from you. We'd like to run a special supplement on this topic in the *Letters* section in an upcoming issue, so please write us with your comments. **m**

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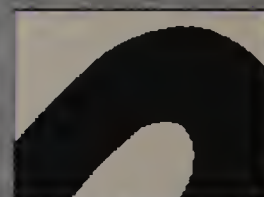
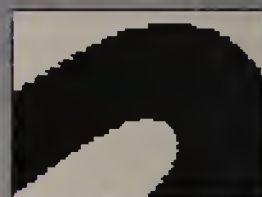
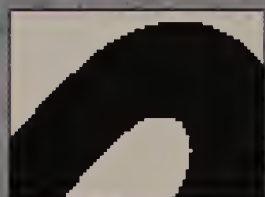
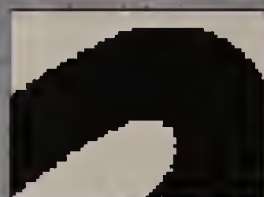
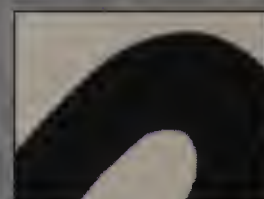
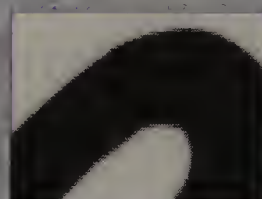
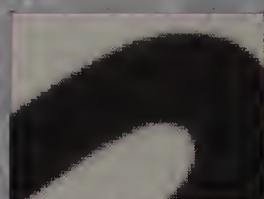
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Microtek 600ZS

\$2,195*



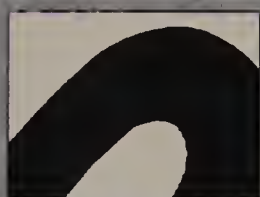
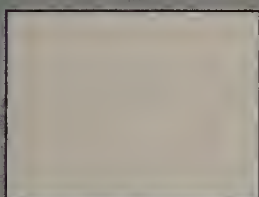
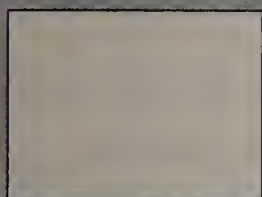
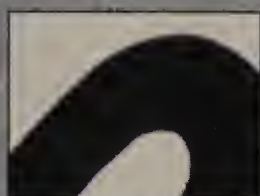
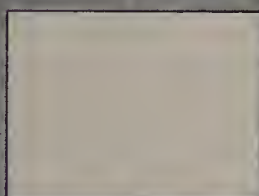
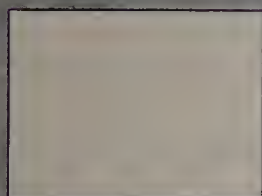
Howtek Scanmaster 3

\$8195**



La Cie Silverscanner

\$1,399

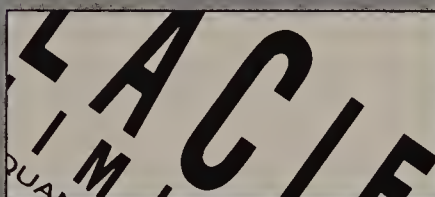


Microtek 600ZS
1200 dpi at 400%—n/a

Howtek Scanmaster 3
1200 dpi at 400%—n/a

La Cie Silverscanner
1200 dpi at 400%

All scans were done at default settings with no corrections. The color images were separated using Adobe Photoshop. The logo was scanned as grayscale and as line art. This entire ad was done on the Macintosh using Silverscanner, Photoshop, Quark XPress and a PostScript Imagesetter. The entire production cost was \$145.



La Cie Silverscanner
1200 dpi at 100%



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Macworld, June 1991



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Silverscanner!

Letters

AUGUST 1992

Experiencing System 7

STEVEN LEVY MADE ME HUNKER down even more about keeping my loyal System 6.0.7 running (*The Iconoclast*, May 1992). The 7.0 SWAT teams are outside my office right now, and all I can hope for is that software developers nationwide keep supporting their pre-7.0 software versions.

*Mark Sieler
Java, South Dakota*

AFTER MONTHS OF READING about the wonders and the absolute necessity of System 7 (read: God's gift to Mackind), it is heartening to finally read Steven Levy stating that System 7 may not be for everyone.

Of the many people I know who use the Macintosh, six of us upgraded. While there were some nice features, for the most part, these were features we were able to use with different INITs before. The main problem is that System 7 took away capability—by making things slower and leaving far less room in RAM.

*Matt Ball
Urbana, Illinois*

MY MOVE TO SYSTEM 7 HAS BEEN relatively trouble-free, and it seems to me that Steven Levy's description of Randall Rothenberg's situation makes an unfair generalization from a case of poor planning.

System 7 did not cause unreasonable upgrade prices, but many software developers are taking advantage of the situation to boost sales. This stinks, but we can hardly blame Apple for it.

*Craig Berry
Chicago, Illinois*

IFEEL SORRY FOR RANDALL ROTHENBERG, but for someone who "takes computing seriously," he is not very computer wise.

Why would someone pay \$99 for a system upgrade when he could have re-

ceived it free from a dealer (with his own disks) or downloaded it for a few dollars online? What Steven Levy should be writing about is the dealer who charged Rothenberg \$190 to buy and install 2MB of RAM.

*Paul Goetze
Eugene, Oregon*

Up on Memory

WITH THE VERY THOROUGH TEXT and excellent supporting photos in "How to Keep Your Mac Current" (May 1992), I was motivated to upgrade my Mac IIci with some more RAM. The article led me step-by-step through the process, which not only enabled me to save the installation cost of the SIMMs, but also gave me the confidence to install the memory myself so that I could order it directly at an additional savings.

My subscription for many years to come has been paid for in the savings on this undertaking. Keep up the good work.

*K. R. Ziegelbauer
Cross Plains, Wisconsin*

THE ARTICLE MAKES NO MENTION of the specific hazards of coming into contact with a charged CRT. To upgrade a compact Mac properly, you must first discharge the CRT following Apple's authorized procedures. This requires donning protective goggles, in case of CRT implosion; removing all jewelry; and while ungrounded, discharging the CRT with the discharge tool. Once the CRT is discharged, the red discharge cable should be disconnected from the CRT. If you do not want to disconnect the discharge cable, a wire with alligator clips at both ends should be used to keep the CRT from being recharged; one end should be clipped to the ground wire of the CRT and yoke assembly, and the other end should be attached to the hole in the CRT where the discharge cable is attached. Now it is time *continues*

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Circle 42 on reader service card

CORRECTIONS

Muse should have received a four-star rating (Reviews, June 1992). The query "six feet by eight inches" returns "4 square feet." Muse does not support sophisticated analyses such as time series projections.

The correct price for the DayStar Digital PowerCache 50MHz is \$1998 ("The Need for Speed," June 1992).

The Mirror 600 Color Scanner costs \$1299; Mirror Technologies only sells its products directly (Reviews, April 1992).

MacHam Technician (News, June 1992) has a list price of \$49.95 and is available from the Coyne Company at 714/855-4689.

to ground the grounding mat, don the grounding strap, and disconnect the video board from the CRT.

*Keith Agosta and Eric Hanson
Livermore, California*

It is true that touching a charged CRT can be hazardous; however, danger from upgrading memory in a compact Mac is negligible when proper procedures, as outlined in the article, are followed.—Ed.

Taking Stock, Some Confusion

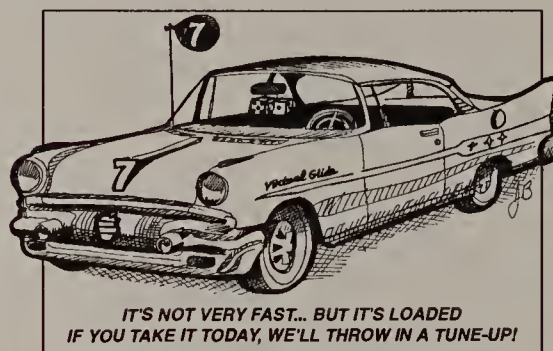
I AM CURRENTLY RUNNING SYSTEM 7.0.1 on a Macintosh Classic II. In your article "Taking Stock of System 7" (April 1992) you state repeatedly that Apple has available System 7.0.1 Tune-Up software. After talking to my dealer and to Apple, it seems that only System 7 Tune-Up is available. Please don't add to my confusion! Apple already told me that I will receive no real benefit since I am already running System 7.0.1, except that I would get the latest versions of Chooser, File Sharing Extension, LaserWriter, and StyleWriter.

*Patrick Genis
via CompuServe*

Sorry for the confusion. Due to our error, System 7 Tune-Up was incorrectly called System 7.0.1 Tune-Up in the article. System 7 Tune-Up, which Apple began distributing in January, enhances System 7.0 and 7.0.1 on all Mac models. It makes System 7 easier to use on Macs with 2MB or 2.5MB of RAM, increases printing performance, and fixes minor bugs. Recently Apple announced version 1.1.1 of System 7 Tune-Up, which also fixes the disappearing-folders bug in System 7. System 7 Tune-Up is available free or for a small charge from Apple dealers, user

groups, and online services. You can also order it for \$10 by calling Apple at 800/947-5176.—Ed.

IN REGARD TO "TAKING STOCK OF System 7," it was an excellent study and a bit sympathetic, as are most articles about the new dog we're all gearing up for. It's not a tune-up, but turbocharging we need. Here's my response:



*Jay Babina
Branford, Connecticut*

Simple SCSI

FIND THE HOW-TO ARTICLES IN *Macworld* to be the most useful. By simplifying many mystifying aspects of the technology, your articles have helped me make the right purchasing decisions and get the most out of my Mac. Your How To on SCSI (*Getting Started*, May 1992) was one of the best ever.

*Don Cortinovis
Lafayette, California*

GETTING STARTED ON SCSI WAS well written but incomplete. Apple's portable computers do not put out voltage on the termination pin of the SCSI port. This means that the peripherals on the SCSI chain must supply their own terminator power from within. You should tell your dealer if a SCSI device you're about to buy will be attached to a portable.

*William Higinbotham
Brookhaven, New York*

It's true that the PowerBooks do not supply termination power; however, according to Apple, any SCSI device should work with a PowerBook, provided you follow the termination guidelines detailed on pages 210 and 211 of the PowerBook manual. Also be sure to turn on any external SCSI devices you've connected before starting up the PowerBook.—Ed.

Readers on Reviews

YOUR REVIEW OF ALDUS PAGE-Maker 4.2 was right on target and included many frustrating deficiencies other magazines don't bother to report (*Reviews*, May 1992). As an avid PageMaker user (since version 1.2), I was extremely disap-

pointed with the half-dozen loadable Additions included in the upgrade. I was particularly concerned that Aldus included an Addition, Make Booklet, that frequently misplaces page elements. What use is a feature that changes your layout without your knowing?

As your review points out, there are some obvious benefits to 4.2. I am not ready to give up my loyalty to PageMaker, but Aldus software developers would benefit by carefully reading your review.

*Andy Newman
Miami, Florida*

IN THE REVIEW OF SPECTRE 1.0, YOU say that this incredibly addicting game is incompatible with ATM (*Reviews*, May 1992). I run a Mac IIci 8/80 under System 7 with several extensions, ATM 2.03 among them, and I've encountered no problems running Spectre.

Also, in the same review, I feel that several items of interest were left out, such as the ability to play in three modes (first-person perspective, slot view as shown in the screen shot, and in an overhead map-type view), the ability to play in various left- and right-handed keyboard combinations or with the mouse, and the ability to create your own tanks according to your specifications. Now you must excuse me . . . Spectre awaits!

*Steven Godun
Piscataway, New Jersey*

CRASH BARRIER (*REVIEWS*, APRIL 1992) was designed for nonprogrammers who want some options other than Restart. One of the major features your reviewer missed entirely was Crash Barrier's ability to identify what the error message means. Before Crash Barrier, the user was left with a meaningless error-message dialog box. Crash Barrier identifies the problem, then makes an attempt to fix the problem. We are not promoting or claiming that Crash Barrier will save you 100 percent of the time. No program or debugger can do that. We are offering an option where there was none in trying to reduce problems before they occur, save work at regular intervals, and—if disaster happens—offer the user the opportunity of saving.

*Terry Kunysz
Vice President, Sales & Marketing
Casady & Greene
Salinas, California*

Unfortunately, some of the error messages our reviewer encountered, such as "the error may have been caused by a fault in the program or an incompatibility," were as abstruse as standard error messages to the nonprogrammer.—Ed.

continues



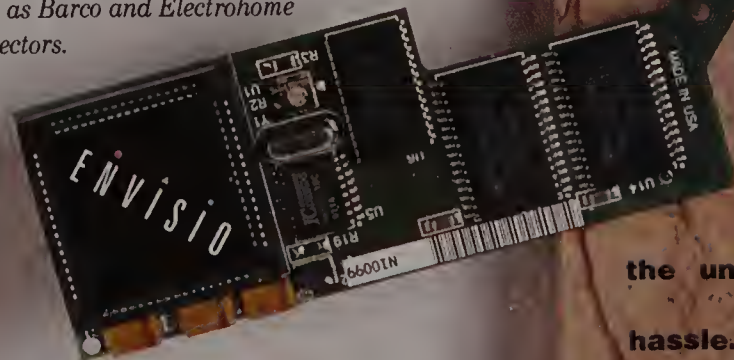
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End users circle 222 on reader service card

Dealers circle 224 on reader service card

More Radiation Studies

IN A RECENT LETTER, JAMES C. LIN of IEEE's Committee on Man and Radiation (COMAR) upbraided *Macworld* for mentioning possible linkages between electromagnetic-radiation exposure and miscarriages (*Letters*, April 1992). His argument was that most of the scientific research on whether VDT use increases miscarriage rates had not verified the many news reports of "miscarriage clusters" and the striking large-population statistical evaluations, such as the 1988 Kaiser Permanente survey of 1600 women, that had seemed to suggest that VDT and miscarriage links might exist.

If you're looking in the wrong place, you won't find what you're looking for, but that doesn't mean it doesn't exist. Many of the ELF-radiation-exposure studies have looked at, say, 10 versus 40 hours a week of VDT use, and haven't found a significant linkage to miscarriage; their premise was that any VDT and health link would be proportional to the exposure duration. But two new studies may finally have looked in the right place. In both of these new studies, the miscarriage effects appear to be proportional to the strength rather than to the duration of the ELF-radiation exposure; the weaker the radiation, the fewer the miscarriages.

Briefly, a new study of VDT-user radiation exposure at work reported to *VDT News*, an industry newsletter, by Dr. Maila Hietanen, a Finnish occupational health researcher, shows about three-and-one-half times the miscarriage risk between more-than-3.2mG and less-than-1.4mG exposures. Another new Finnish study, of similar ELF-magnetic-radiation exposure, but at home and from power lines rather than VDTs, reported a fivefold difference in miscarriage rates between more-than-2.5mG and less-than-0.4mG small exposures. Companies that help users understand and control their ELF exposure are perhaps doing a better job of serving the public interest than are big-business-backed organizations such as COMAR that deny any risks exist.

John Schaefer
President

Schaefer Applied Technology
Burton, Michigan

IN THE PAPER "OCCUPATIONAL EXPOSURE to Electromagnetic Fields and Breast Cancer in Men," the "exposure" was guesstimated from the answers to questions about work history on a questionnaire filled in by cancer victims or their descendants. No indication is given

continues

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MacUser, June '90

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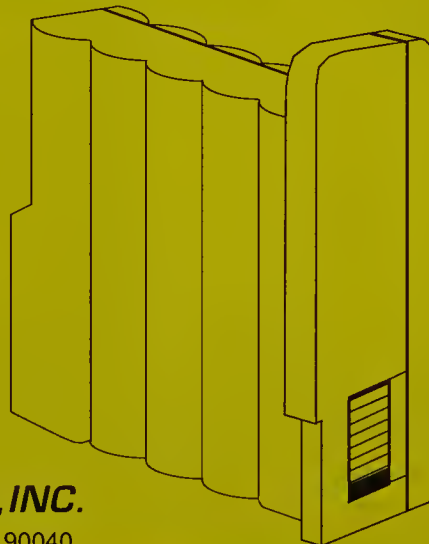
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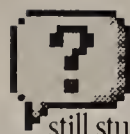
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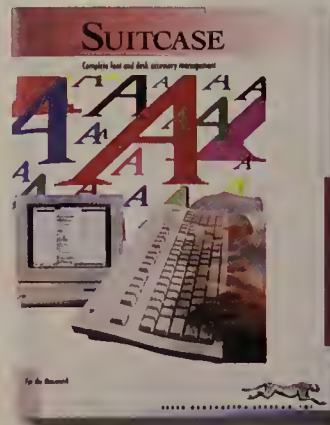
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COMPUTERS

Outbound Systems, Inc.

A MacConnection exclusive! Each Outbound Notebook includes a 1.4 Floppy Drive, slip case, power supply & a limited time special software bundle offer valued over \$400.

Full line available; partial listing.

- ⑦2030E Series (25 MHz 68ec030)
2147 442: 4 MB, 40 MB HD (incl. math copro.) 2899.
2109 462: 4 MB, 60 MB HD (incl. math copro.) 2999.
2659 862: 8 MB, 60 MB HD (incl. math copro.) 3249.
2653 882: 8 MB, 80 MB HD (incl. math copro.) 3499.
⑦2030S Series (33 MHz 68ec030)
2107 442: 4 MB, 40 MB HD (incl. math copro.) 3379.
2105 462: 4 MB, 60 MB HD (incl. math copro.) 3579.
2684 862: 8 MB, 60 MB HD (incl. math copro.) 3839.
2669 882: 8 MB, 80 MB HD (incl. math copro.) 4079.

DAILY BUSINESS

ACCOUNTING, DATABASES, SPREADSHEETS, WORD PROCESSING

A Lasting Impression

- ⑦ResumExpert or Cover Letters..... ea. 48.

Abacus Concepts

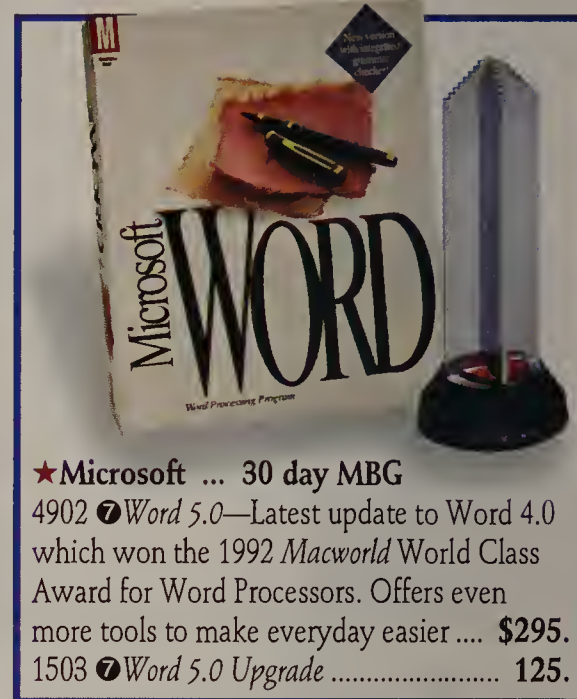
- 7106 ⑦StatView 4.0 (June '92) 369.

★Acius ... 30 day MBG

- 5618 ⑦4th Dimension 2.2.3..... 509.

Amaze, Inc.

- 4989 ⑦CATHY Daily Planner..... special 39.
3582 ⑦The Far Side Computer Calendar 45.



★Microsoft ... 30 day MBG

- 4902 ⑦Word 5.0—Latest update to Word 4.0 which won the 1992 *Macworld* World Class Award for Word Processors. Offers even more tools to make everyday easier \$295.
1503 ⑦Word 5.0 Upgrade 125.

★ASD Software ... 30 day MBG

- 5313 ⑦Active Memory 2.0 (1 user) 125.
5314 ⑦(5 user)... 315. 5315 ⑦(10 user).. 625.

★Avery ... 60 day MBG

- 7446 ⑦MacLabel Pro 1.5 48.

★Banner Blue ... 30 day MBG

- 3548 ⑦Org Plus Advanced 1.0..... 125.

★Baseline Publishing ... 30 day MBG

- 8881 ⑦Thunder 7 1.0.5..... 55.

★Beagle Bros. ... 30 day MBG

- 3119 ⑦BeagleWorks.. 184. 3563 Upgrade ... 95.

★Chena Software ... 30 day MBG

- 1594 ⑦Fair Witness 1.2..... 189.

★Claris ... 30 day MBG

- 1129 ⑦MacWrite II 1.1V2 89.
3903 ⑦ClarisWorks 1.0 199. 3743 ⑦Upgrade 95.
3531 ⑦Claris Resolve 125. 3745 ⑦Upgrade 95.
8216 ⑦FileMaker Pro 1.0V2 199.
1125 ⑦MacProject II 2.5V1 345.

★Essential Software ... 30 day MBG

- 4086 ⑦Easy Alarms 2.0 (July '92)..... 61.
7117 ⑦(5 user)... 189. 7113 ⑦(10 user)... 319.

★Expert Software ... 30 day MBG

- 5234 ⑦Expert Writer 1.0..... 29.

★Intuit ... 30 day MBG

- 2507 ⑦Quicken 3.0 42.

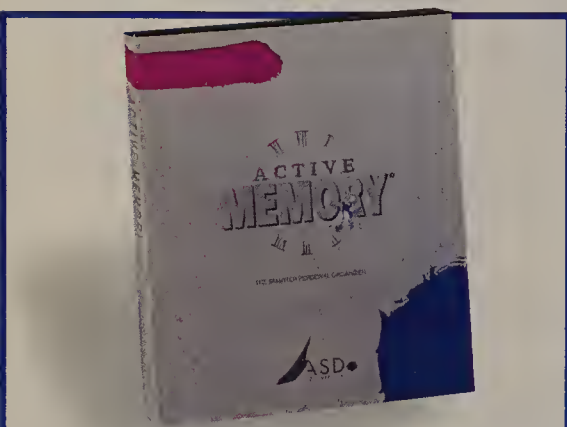
★Kaetron Software ... 30 day MBG

- 7066 ⑦OrgChart Express (July '92) 124.
8941 ⑦TopDown 3.1 199. 6317 Upgrade 129.



★Baseline Publishing ... 30 day MBG

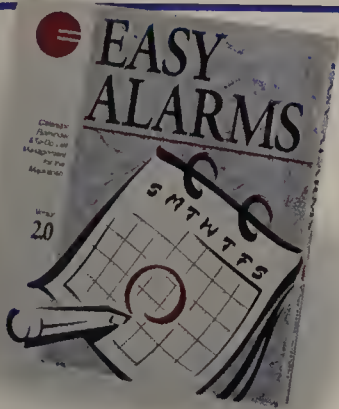
- 8881 ⑦Thunder 7 1.0.5—Truly interactive spelling & thesaurus program for all applications \$55.
7783 ⑦INIT Manager 1.1—Locate, manage & analyze all your start-up documents..... 33.
3114 ⑦INIT Info Pro 1.0—The guide to INIT compatibilities and system conflicts..... 39.



★ASD Software ... 30 day MBG

- 5313 ⑦Active Memory 2.0—Facilitates sharing reminders and info over a LAN. Unlike other PIM's it's designed for networks and is System 7 savvy \$125.
5314 ⑦(5 user).. 315. 5315 ⑦(10 user).. 625.

at MacConnection?



★ **Essential Software** ... 30 day MBG
4086 **Easy Alarms 2.0**—Personal reminders made easy! New 2.0 features calendars with text, customizable list windows, and printing of datebooks and calendars..... \$61.
7117 **(5 user)**.. 189. 7113 **(10 user)**.. 319.

★ **Lotus Development** ... 30 day MBG
3606 **1-2-3 for Mac**.. 329. 3604 **Upgrade** . 89.
★ **MECA** ... 60 day MBG
2796 **Managing Your Money 4.0** 49.
★ **Microlytics** ... 60 day MBG
6461 **WordFinder Plus** 39.
7820 **Random House Encyclopedia 1.0** 68.
★ **Microsoft** ... 30 day MBG
2884 **Works 2.00E**..... 155.
3669 **Excel 4.0 (June '92)** 295. 5237 **Upgrade** 99.
4902 **Word 5.0**... 295. 1503 **Upgrade** .. 125.
5454 **The Microsoft Office 2.5 (June '92)**.. 475.
★ **Niles & Associates** ... 30 day MBG
4602 **EndNote 1.5**... 85. 8010 **Plus 1.2** 145.
Nisus Software
5683 **Nisus 3.06** 238. 1612 **Compact 3.3** 92.
★ **Nolo Press** ... 30 day MBG
2981 **WillMaker 4.0 (not valid in LA.)**..... 35.
1204 **Living Trust 1.0 (not valid in LA.)**..... 45.
★ **OCCAM Research Corp.** ... 60 day MBG
3697 **MUSE 1.01** 469.



★ **Microsoft** ... 30 day MBG
3669 **Excel 4.0**—Latest update to Excel 3.0 which won the 1992 *Macworld* World Class Award for *Spreadsheets*. Even more powerful and easy-to-use than before \$295.
5237 **Excel 4.0 Upgrade** 99.

★ **Palo Alto Software** ... 60 day MBG
6932 **Employee Handbook Toolkit**..... \$65.
6975 **Business Plan Toolkit** 75.
★ **Pastel Development** ... 30 day MBG
1785 **DayMaker 1.01** 61.
PC Globe, Inc.
3608 **MacUSA**... 35 3356 **MacGlobe** ... 46.
★ **Portfolio Systems** ... 30 day MBG
7992 **DynoPage 1.7 or 6916 Dynodex**. ea. 75.
★ **PowerUp** ... 30 day MBG
7696 **Calendar Creator 1.01 limited special** 39.
★ **Provue** ... 60 day MBG
4582 **Panorama II 2.0.5** 239.
★ **Reality Technologies** ... 30 day MBG
6929 **WealthBuilder 1.02** 95.
★ **Reference Software** ... 30 day MBG
6268 **Grammatik Mac 2.0** 58.
Round Lake Publishing
7129 **LetterWorks, SALES or LEGAL** ea. 45.
★ **SoftSync, Inc.** ... 30 day MBG
2237 **Accountant, Inc. 3.35. 3828 MultiUser** 569.
★ **Symantec** ... 30 day MBG
3422 **GreatWorks 2.0 129. 2278 Upgrade** 99.
★ **Synergy** ... 30 day MBG
6617 **KaleidaGraph 2.1.3**..... 150.
★ **Teleware** ... 30 day MBG
7616 **M.Y.O.B. 3.0** 138.
★ **TIMESLIPS** ... 30 day MBG
2986 **Timeslips III 2.1** 194.
★ **T/Maker** ... 30 day MBG
3639 **WriteNow 3.0 149. 5259 Upgrade** 49.
5253 **WriteNow 3.0 Competitive Upgrade** ... 69.
★ **Vertical Solutions** ... 60 day MBG
5886 **FastLabel 3.1** 45.
★ **WordPerfect** ... 60 day MBG
3800 **WordPerfect 2.1 279. 4711 Upgrade** 89.
★ **Wordstar** ... 30 day MBG
6984 **Correct Grammar 3.01**..... 55.
3554 **American Heritage Dictionary 1.0**..... 59.
5281 **Correct Writing, Quotes & Letters**..... 75.
★ **Working Software** ... 60 day MBG
5896 **Last Resort 38. 3792 Spellswell 2.2** 44.

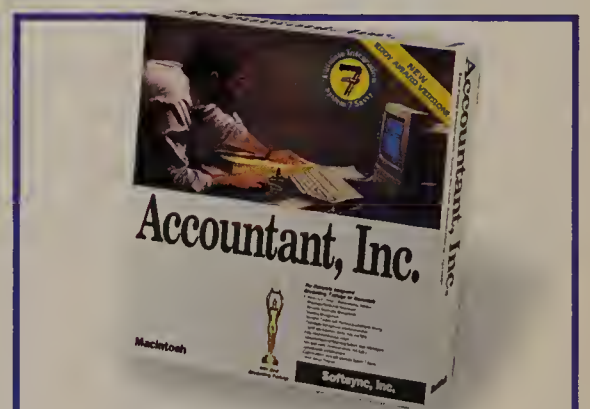
GRAPHICS & DESIGN PUBLISHING, PRESENTATIONS

★ **Abracadata, Ltd.** ... 30 day MBG
9990 **Design Your Own Home - Architecture, 9992 Interiors or 9994 Landscape**... ea. 59.
Adobe Systems
8794 **Adobe Type Sets for Business** ea. 95.
6957 **Adobe Type Library (Vol. 1-260)**..... call
5750 **Adobe Type On Call (CD-ROM)** 56.
6053 **Adobe Type Reunion 1.0.2** 41.
6098 **Adobe Type Manager 2.0.3** 59.
5001 **Adobe Plus Pack 2.0** 118.
4145 **TypeAlign for ATM 1.0.4** 61.
8171 **Adobe Streamline 2.0** 122.
6644 **Adobe Premiere 1.0** 305.
★ **Aldus** ... 30 day MBG
6674 **Aldus Personal Press 2.0** 99.
2461 **Aldus Gallery Effects 1.0** 128.
3506 **Aldus SuperPaint 3.0** 132.
3507 **Aldus Super 3D 2.5** 325.
4751 **Aldus Persuasion 2.1** 325.
1330 **Aldus FreeHand 3.1** 394.
7088 **Aldus PageMaker 4.2** 494.



Adobe Systems
6644 **Adobe Photoshop 2.01**—1992 *Macworld* World Class Award for *Image Processing* \$548.
4145 **Adobe Premiere 1.0** 305.
8171 **Adobe Illustrator 3.2 (w/ATM)** 368.

Altsys
1983 **EPS Exchange 2.0** 89.
1195 **Fontographer 3.5** 259.
★ **Ares Software** ... 30 day MBG
8878 **FontMonger 1.5 (June '92)** 93.
★ **Baseline Publishing** ... 30 day MBG
8055 **Screenshot 1.2** 34.
Broderbund Software
3572 **Kid Pix 1.2**.. 34. 1427 **Print Shop**.. 35.
6281 **TypeStyler 2.0 (with ATM)** 126.
★ **Casady & Greene** ... 30 day MBG
8879 **Fluent Font Library 4.05** 99.
★ **Claris** ... 30 day MBG
2518 **MacDraw Pro 275. 4733 Upgrade** 99.
8007 **Claris CAD 2.0** 599.
Custom Applications
8037 **Freedom of Press Light 3.03 (17 fonts)**. 84.
★ **DeltaPoint** ... 60 day MBG
3558 **DeltaGraph Pro 2.0** 199.
★ **Deneba Software** ... 30 day MBG
3227 **Canvas 3.02** 248.



★ **SoftSync, Inc.** ... 30 day MBG
7129 **Accountant, Inc. 3.0**—1991 *MacUser* Editors' Choice Award for *Best Accounting Package*. "The most complete integrated accounting and financial mgmt. package," *MacUser* (3/91) \$335.
3828 **Accountant, Inc./MultiUser 1.0** 569.

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Why, it's Apple's



★ Aldus ... 30 day MBG

6674 **Personal Press 2.0**—New version, System 7 savvy. Page layout program intelligently assembles text & graphics automatically. Features "Intelligent" templates, Copy Fitting, AutoFlow, word processing, text wrap, etc. **\$99.**

PROGRAMMING

UTILITIES, HYPERCARD, SECURITY

★ Abbott Systems ... 30 day MBG

2515 **Calc+ 1.0** 39 5236 **CanOpener 2.0** \$59.
After Hours Software
1352 **TouchBASE 2.0.1** 79.
3314 **DateBook 1.0** 79.

★ Aladdin Systems ... 30 day MBG

6740 **StuffIt Deluxe** 55.

★ Aldus ... 30 day MBG

5100 **Aldus SuperCard 1.6** 195.

★ ALSoft ... 30 day MBG

9808 **MasterJuggler 1.57C** 25.
9807 **DiskExpress II 2.11** 49.
5204 **ALSoft Power Utilities 1.01** 62.

★ Alys Software ... 30 day MBG

2687 **SuperDisk!** 49.
1608 **More Disk Space** 55.

Apple Computer

1074 **System 7 Personal (w/free PCTV video)** 79.
3413 **System 7 Group Upgrade Kit** 259.
7072 **QuickTime Starter Kit** 149.



★ ASD Software ... 30 day MBG

2552 **WindoWatch**—A transparent window tracking utility that automatically generates a time sheet in the background or over a LAN as you work **\$91.**
2549 **(5 user)**.. 279. 2548 **(10 user)**.. 469.

★ Expert Software ... 30 day MBG

4870 **Expert Color Paint 1.0** 29.
Fractal Design

5425 **Painter 1.2** 235.

★ Letraset ... 30 day MBG

4709 **LetraStudio 2.0** 139.
Light Source

3733 **Ofoto 1.1.1** 279.

★ Linguist's Software ... 60 day MBG

Over 100 language fonts..... call

★ MacroMedia ... 30 day MBG

7441 **Swivel 3D Professional 2.0** 479.

★ MicroMaps ... 30 day MBG

7556 **MapArt (PICT) or 7555 (EPS)**..... ea. 89.

★ Microsoft ... 30 day MBG

2878 **PowerPoint 2.01E** 245.

Postcraft International

2210 **Effects Specialist 1.04** 89.
Quark

7612 **QuarkXPress 3.1** 549.

★ Specular International ... 30 day MBG

4962 **Infini-D 1.1** 647.

★ Timeworks ... 30 day MBG

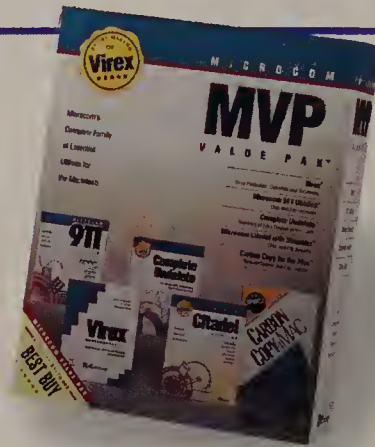
7115 **Publish It! Easy 2.1 w/File-It!**.. special 89.

★ T/Maker ... 30 day MBG

ClickArt bitmapped... 38. or EPS... 82.
1858 **FaxMania (birthdays-bulletins)** 45.

★ Virtus Corporation ... 30 day MBG

4488 **WalkThrough 1.1** 309.



★ Microcom ... 30 day MBG

6978 **Microcom Value Pak (MVP)**—A Collection of essential utilities for the Mac. Now available at one great price. MVP includes Virex, 911 Utilities, Complete Undelete, Citadel & CarbonCopy..... **\$144.**

★ ASD Software ... 30 day MBG

5 & 10 users packs available.

7085 **FileGuard 2.7 (1 user)** 138.

2552 **WindoWatch (1 user)** 91.

★ Baseline Publishing ... 30 day MBG

7783 **INIT Manager 1.1** 33.

3114 **INIT Info Pro 1.0** 39.

★ Berkeley Systems ... 30 day MBG

5737 **After Dark 2.0V** 28.

2198 **More After Dark (M.A.D.)** 23.

2196 **After Dark & M.A.D. Bundle** 40.

★ Casa Blanca Works ... 30 day MBG

1593 **Drive 7 2.01** 49.

★ CE Software ... 60 day MBG

1727 **CalendarMaker 3.0.1** 31.

8024 **QuickKeys² 2.1.2** 93.

★ Central Point ... 30 day MBG

5041 **Mac Tools Deluxe 2.0 (June '92)** 92.

★ Claris ... 30 day MBG

8734 **HyperCard Development Kit 2.1** 139.

★ Dantz Development ... 30 day MBG

3393 **DiskFit Pro 1.0** 72.

5255 **Retrospect 147.** 7945 **Remote 1.3** 264.

7946 **Remote (10 Pak)** 147. 3112 **(50 Pak)** 649.

★ Fifth Generation ... 30 day MBG

4287 **PYRO! 4.01** 27.

3955 **Suitcase 2.0** 53.

8286 **SuperLaserSpool 3.0** 99.

5178 **FastBack Plus or 5725 DiskLock**... 125.

★ FWB, Inc. ... 30 day MBG

2999 **Hard Disk Toolkit 1.1** 125.

★ ICOM Simulations ... 30 day MBG

6296 **Intermission 1.0 (June '92)** 29.

3731 **OnCue II 2.0** 55.

★ Insight Development ... 30 day MBG

6171 **MacPrint 1.3** 92.

★ Kent Marsh Ltd. ... 30 day MBG

9513 **FolderBolt 1.02** 71.

1839 **NightWatch II** 89.

★ Kiwi Software ... 60 day MBG

6267 **KiwiENVELOPES! 3.1.5** 32.

3518 **KiwiPOWERWINDOWS** 50.

★ Magic Software ... 30 day MBG

7267 **AutoSave II** 26.

7270 **Backmatic** 50.

★ Microcom ... 30 day MBG

4803 **Virex/Mac**... 57. 5885 **(10 user)**.. 399.

8561 **911 Utilities or 2462 Citadel w/Shredder** 89.

6978 **Microcom Value Pak (MVP) (see box)** 144.

MicroMat Computer Systems

3732 **MacEKG II** 110.

★ Microseeds Pub. ... 60 day MBG

7068 **INITPicker 2.02** 34.

2913 **Redux 1.63 or 2936 HAM** ea. 49.

★ Nine to Five Software ... 30 day MBG

9767 **Reports 2.1** 94.

★ Now Software ... 30 day MBG

1793 **Now Up-To-Date 1.0 (1 user)** 65.

2371 **(5 user)**... 259 2366 **(10 user)**... 395.

6925 **Now Utilities 3.02** 83.

★ ON Technology ... 1 year MBG

6385 **On Location 2.0** 75.

Palomar Software

8210 **PLOTTERgeist 2.0** 249.

★ Salient Software ... 30 day MBG

7404 **DiskDoubler 3.7.5** 45.

4838 **AutoDoubler**.. 45. 6092 **(10 pak)** ... 295.

★ Symantec ... 30 day MBG

5176 **Symantec AntiVirus for Mac (SAM)**... 64.

5724 **Symantec Utilities for Mac (SUM II)**... 96.

6748 **Norton Utilities for Mac 2.0** 95.

3421 **THINK Pascal 165.** 2688 **THINK C** 199.

9957 **THINK Reference 1.0** 68.

Teknosys

5203 **HELP!** 89.

★ TGS Systems ... 60 day MBG

6667 **Prograph 2.5** 309.

★ Thought I Could ... 30 day MBG

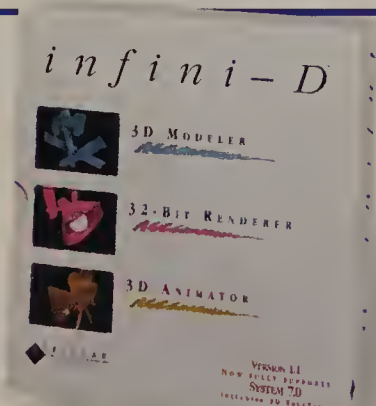
4843 **Wallpaper 1.0.2** 37.

UserLand Software

4753 **Frontier** 189.

★ Visionary Software ... 30 day MBG

3887 **First Things First 2.1** 41.



★ Specular International ... 30 day MBG

4962 **Infini-D 1.1**—An integrated 3D modeling, 32-bit rendering, & 3D animation package. A powerful 3D environment to create images and present ideas. Features: anti-aliasing, shadowing, 3D texture mapping, noise, & shading... **\$647.**

software collection



★ Claris ... 30 day MBG

2518 **MacDraw Pro 1.5**—Powerful new upgrade with significant performance enhancements & speed, it now provides full System 7 functionality & QuickTime support..... **\$275.**
4733 **MacDraw Pro Upgrade** **99.**

LEARN & PLAY

FOREIGN LANGUAGES, TRAINING, GAMES

- ★ **Abracadata, Ltd.** ... 30 day MBG
- 5805 **Sprout! 1.0** (*veggie garden planner*)... 47.
- ★ **Baseline Publishing** ... 30 day MBG
- 7785 **Talking Moose 4.0.2** 22.
- Broderbund Software**
- 6516 **The Playroom 2.0 (CP) (color)** 29.
- Carmen Sandiego Series (CP)**..... ea. 29.
- 3559 **SimAnt...** 35 8266 **SimEarth 1.1** .. 40.
- 4966 **SimCity (CP)** .. 29. 5871 **Supreme** .. 47.
- ★ **Centron Software** ... 30 day MBG
- 2707 **Puzzle Master** 26.
- 8525 **Casino Master...** 39. 8524 (*Color*)... 45.
- ★ **Cyan** ... 30 day MBG
- 6320 **Manhole 1.6** 19.
- ★ **Davidson & Associates** ... 30 day MBG
- 3922 **Talking Spell It Plus** 29.
- 7024 **Headline Harry & the Great Paper Race** 34.



★ ALSoft ... 30 day MBG

9807 **DiskExpress II 2.11**—The world's safest, most powerful disk optimizer that gives you all the speed you need. Only DiskExpress II intelligently monitors daily activity for personalized hard disk optimization **\$49.**

- 2574 **New MathBlaster Plus** \$34.
- 8278 **Alge-Blaster Plus** 34.
- EARTHQUEST**
- 8050 **EARTHQUEST or 3118 Ecology 1.0** 34.
- Electronic Arts**
- 5702 **4D Boxing...** 32. 1907 **PGA Golf...** 39.
- ★ **Expert Software** ... 30 day MBG
- 6219 **Expert Astronomer 1.0**..... 29.
- Graphic Simulations**
- 4756 **Hellcats Over the Pacific 1.0** 39.
- ★ **Great Wave** ... 30 day MBG
- 6693 **KidsMath 2.0 (Color)** 35.
- 4334 **NumberMaze** .. 25. 8527 (*Color*) . 35.
- ★ **HyperGlot Software** ... 30 day MBG
- Word Torture 4.0** -Beginner to Advanced (*Span., Fren., Germ., Ital., & Rus.*)... ea. 34.
- Pronunciation Tutor** - Beginner (*Span., Fren.*) ea. 34. (*Germ., Chin.*) ea. 38.
- Tense Tutor 2.0** (*Spanish, French, German, Italian*).. ea. 38.
- ★ **Inline Design** ... 30 day MBG
- 1562 **3 in Three or 1944 Swamp Gas.** ea. 31.
- 8809 **Tesseract 31.** 3414 **Mutant Beach** 43.
- Interplay Productions**
- 1894 **BattleChess (3D animation)**..... 29.
- 1893 **CheckMate (infinite play levels)**..... 31.
- ★ **Learning Company** ... 30 day MBG
- 2670 **Reader Rabbit 3.0 (CP) (ages 4-7)**..... 34.
- 3687 **Super Solvers: Midnight Rescue!** 34.
- 3281 **The Writing Center 1.0** 51.
- ★ **Leister Productions** ... 30 day MBG
- 7126 **Reunion 3.0** 115.
- Mallard Software**
- Scenery Disk 1-4 Flight Simulator.** ea. 19.
- ★ **MECC** ... 30 day MBG
- 3963 **Oregon Trail 1.0**..... 28.
- Number, Word, or Super Munchers** ea. 28.
- ★ **MicroMaps** ... 30 day MBG
- 2784 **KidMaps 1.0**..... 16.
- ★ **Microsoft** ... 30 day MBG
- 2868 **Flight Simulator 4.0 (CP)** 42.
- ★ **Nordic Software** ... 30 day MBG
- 8258 **Turbo Math Facts 2.0** 24.
- 8257 **PreSchool Pack - Color 1.0** 34.
- ★ **Penton Overseas** ... 30 day MBG
- VocabuLearn/ce Levels I & II (Span., Fren., Germ., Ital., Rus., Japan., & Heb.)** ... ea. 35.
- VocabuLearn/ce Level III (Span., Fren., Germ., Ital., Rus., & Japan.)**..... ea. 35.
- ★ **Personal Training Sys.** ... 60 day MBG
- Over 60 learning levels from beginner to advanced for System 7, QuarkXPress, Persuasion, FileMaker Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, Excel & the Mac*ea. 59.
- Sierra On-Line**
- 3545 **EcoQuest (June '92)**..... 35.
- 3552 **Leisure Suit Larry V** 39.
- ★ **SoftStream** ... 30 day MBG
- 4489 **Galactic Frontiers** 38.
- Software Toolworks**
- 4619 **Mavis Beacon Typing 1.3 (CP)**..... 32.
- ★ **Spectrum Holobyte** ... 30 day MBG
- 3464 **Tetris 1.3.** 22. 3017 **Wordtris 1.0** . 27.
- 3459 **Falcon 2.2.1 or 8181 Vette 1.0** ... ea. 33.
- ★ **Strategic Studies** ... 30 day MBG
- 3287 **Warlords (empires at war)** 34.
- StudyWare**
- ACT, GMAT, GRE or SAT Prep** ... ea. 29.
- ★ **TeleTypesetting** ... 30 day MBG
- 5537 **Digital Gourmet 1.0**..... 44.



MicroMat Computer Systems

3732 **MacEKG II**—Provides in-depth knowledge on what makes your Mac tick. Features: advanced component-level diagnostics, log & compare 178 different parameters, ability to isolate/diagnose intermittent failures.... **\$110.**

Terrace Software

- 9970 **Mum's The Word Plus 1.01 (color)**... 107.
- ★ **Toyogo** ... 30 day MBG
- 7624 **NEMSIS Go Master 5.0** 39.
- 7623 **NEMSIS Go Master Deluxe 5.0** 99.
- ★ **Voyager** ... 30 day MBG
- 2809 **The Annotated Alice, 2836 Hitch Hiker's Guide to Galaxy, 2820 Jurassic Park** ea. 15.

VIDEO AND SOUND

MONITORS, MUSIC, ANIMATION

- ★ **Ars Nova** ... 30 day MBG
- 1215 **Practica Musica 2.3** 66.
- Coda Music Systems**
- 8188 **MusicProse.** 189. 5604 **Finale** ... 549.
- ★ **MacroMedia** ... 30 day MBG
- 4598 **MacRecorder Sound System PRO**... 239.
- 5087 **MacroMind Director 3.1 (June '92)** ... 799.
- 2246 **MacroMind Three-D 1.0**..... 999.



UserLand Software

4753 **Frontier**—Power user's scripting system for System 7. Write & run your own utilities to customize the Mac file system, networks & applications. "Mac users have wanted something like this since 1984" (*MacUser* 12/91) **\$189.**

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- ★Berkeley Systems ... 30 day MBG
5737 ⑦After Dark 2.0V—1992 Macworld World Class Award for Utility-System Enhancement. Stops screen burn-in..... \$28.
2198 ⑦More After Dark (M.A.D.) 23.
2196 ⑦After Dark & M.A.D. Bundle..... 40.

- NEC**
5021 MultiSync 6FG 2899.
★Nutmeg Systems ... 30 day MBG
⑦19" for SE, SE/30, II, IIsi..... ea. 995.
⑦19" for GrayScale SE/30, II, IIsi..ea. 1295.
⑦20" Color System: SE/30, II, IIsi ea. 2595.
PCTV
2244 System 7 Video . 9. 2245 w/Lon's Book 25.
RasterOps
9784 RasterOps 24SX .. 649. 8944 24STV 829.
Sigma Designs
6944 Power Portrait (platinum)..... 769.
Software Toolworks
5201 The Miracle (piano teacher) 349.
Sound Source
3547 ⑦Star Trek: The Logical Collection 29.
3607 ⑦Star Trek: The Final Frontier 29.
4920 ⑦Star Trek: The Bundle (I gotta have both!) 49.
★SuperMac Technology ... 30 day MBG
4122 VideoSpigot LC or 4114 IIsi ... special 349.
4164 VideoSpigot (for NuBus) .limited special 399.
1805 20" SuperMatch Color Display 1799.
5000 20" Dual-Mode Trinitron 2699.
4720 21" Platinum Two-Display 1099.
1877 Spectrum/8LC or 2026 S/8si ea. 536.
1844 Spectrum/8 Series III 536. 1851 /24 Series III 1525.
2330 Spectrum/8•24 PDQ or 2231 PDQsi ea. 899.
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9322 ⑦Voyager Videostack CD 2.2 65.

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3730 ⑦Just Grandma and Me (CD-ROM)..... 34.
CD Technology
2321 CD-ROM Caddy ... 11. 2533 (5 Pack) 49.
8057 Porta Drive CD-ROM..... 579.
★Cyan ... 30 day MBG
2717 ⑦Cosmic Osmo 1.1 (CD-ROM)..... 37.
★Discovery Systems ... 60 day MBG
9967 ⑦Nautilus (subscription,CD-ROM) 20.
6823 ⑦Best of MIDI Connection..... 32.
3683 ⑦Backpac Set 1 or 3679 ⑦Set 2..... ea. 45.
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7056 ⑦Panoramix Vol. 1 (CD-ROM)..... 69.
★Highlighted Data ... 30 day MBG
7771 ⑦Webster's Dictionary (CD-ROM)..... 159.
6968 ⑦Footage '91 (CD-ROM) 159.
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7473 ⑦Learn to Speak French or 7829 Spanish 62.
★ICOM Simulations ... 30 day MBG
3717 ⑦Sherlock Holmes, Consulting Detective 39.

- NEC**
6577 CDR-37 CD-ROM Portable Drive..... \$399.
6826 General Reference CD-ROM Bundle .. 529.
6582 CDR-74 CD-ROM Drive 589.
Software Toolworks
4397 ⑦Time Table of History (CD-ROM) 57.
3915 ⑦Grolier Encyclopedia (CD-ROM) 249.
★Voyager ... 30 day MBG
3917 ⑦A Silly, Noisy House CD 39.
3918 ⑦Baseball's Greatest Hits CD 49.

COMMUNICATIONS

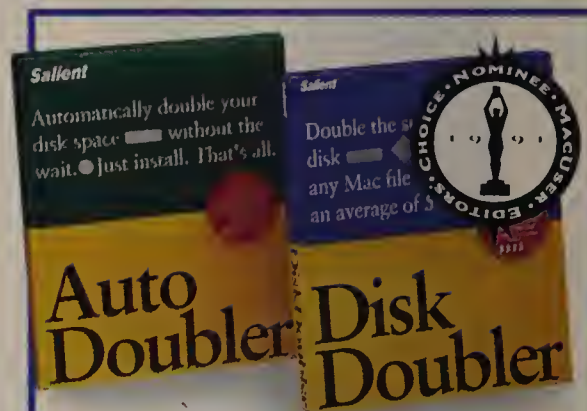
MODEMS, MAIL, NETWORKS

- Apple Computer**
7073 ⑦Macintosh PC Exchange 69.
7101 ⑦AppleTalk Remote Access 165.
7102 ⑦AppleShare 3.0..... 999.
★Applied Engineering ... 30 day MBG
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4842 ⑦MacLink Plus/Translator 6.0 109.
★Dayna ... 60 day MBG
DaynaPORT TRX: (BNC or 10 BASE-T) ea. 87.
DaynaPORT E: (10BASE-T) ea. 149.
DaynaPORT E: SE, SE/30 II, IIsi, LC... 149.
8719 EtherPrint 345. 9888 (10BASE-T) ea. 339.
DaynaPORT SCSI/Link (BNC or 10 BASE-T) 269.
3664 NetMounter..... 57.
Dove Computer
6758 ⑦DoveFax 2.0 .. 199. 3352 NuBus 229.
9634 ⑦DoveFax Plus .. 265. 4111 NuBus 299.
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4869 PhoneNET Connector 10-Pk (DIN8) ... 198.
2206 PhoneNET StarController 307..... 879.
4802 Star 357... 1025. 4814 Star 377 ... 1299.
9961 PhoneNET Card PC 209.
★Freesoft ... 60 day MBG
6115 ⑦White Knight 11 85.
★Global Village ... 30 day MBG
8946 ⑦TelePort A300 1.06..... 129.
8945 ⑦TelePort/FAX 1.06 169.
5327 ⑦TelePort/Full FAX 2.0 219.



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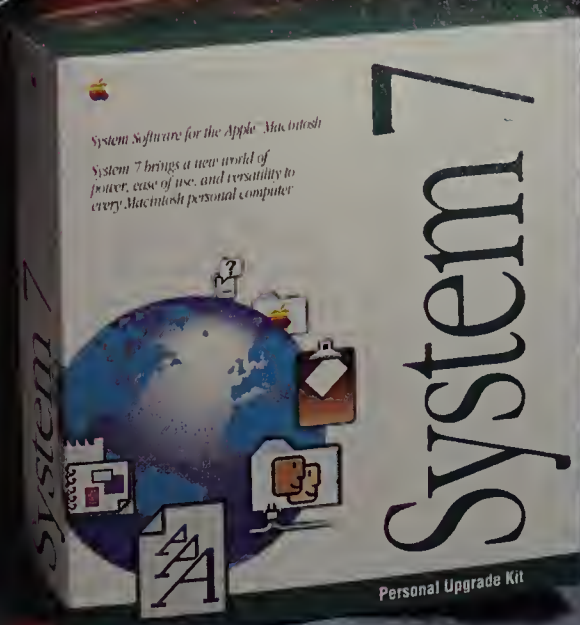
- Hayes**
5101 HayesConnect 3.0 (modem sharing)..... 75.
2300 ⑦Smartcom II for the Mac 3.3B..... 84.
1345 OPTIMA 24 Modem 155. 3522 96 Mod. 389.
Insignia Solutions
7557 ⑦Access PC 2.0 60.
9726 ⑦Entry Level SoftPC 2.5 125.
4089 ⑦Universal SoftPC 2.5 195.
3229 ⑦SoftAT 2.5..... 299.
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5523 Quicktel Xeba M1414XV 439.
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MASS Microsystems
3655 MASS fm 24/96 (portable modem)..... 185.
★Microcom ... 30 day MBG
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★Microsoft ... 30 day MBG
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★Practical Peripherals ... 30 day MBG
8994 2400 V.42bis Modem 125.
7934 PM9600SA Modem 1.26 289.
9849 ⑦SmartPack 9600 (with Smartcom II). 349.
★Prometheus ... 30 day MBG
2590 ⑦ProModem 2400 Mini Plus 129.
4724 ⑦ProModem Home Office 259.
8990 ⑦ProModem Ultima Home Office..... 489.



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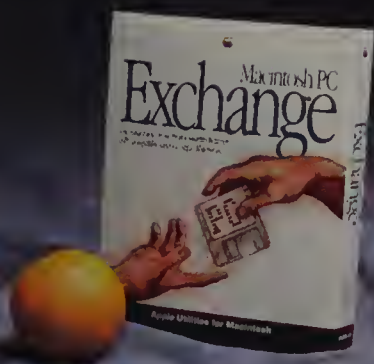
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—Macworld, 7/91

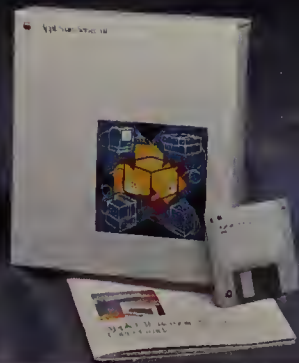


1074 7 System 7 Personal Upgrade Kit **\$79.**
3413 7 System 7 Group Upgrade Kit..... **259.**

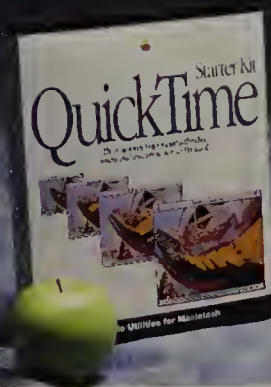
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Sitka/TOPS

- 4188 Teleconnector (DIN8) 23. 2230 (10). 189.
6264 ⑦TOPS Network 3.1 187. 2419 (3-Pak) 249.

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- 3455 ⑦MicroPhone II 4.0..... limited special 179.

★ Synergy ... 30 day MBG

- 6618 ⑦VersaTerm 4.6 90. 6619 PRO 3.6. 177.

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2400 ⑦Mac 340 ... 239. 3544 ⑦Exodus 3.0 199.

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3576 ⑦FX9624V Send/receive V.42 Fax/Modem 145.
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2311 ⑦V.32 Turbo Modem (with MacPack). 255.
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2769 MousePen Pro Mac..... 65.

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- 4476 ⑦OmniPage 459. 4930 ⑦Professional 649.

Calera

- 4931 ⑦WordScan 189. 4697 ⑦WordScanPlus 379.

CoStar

- 1448 AddressWriter..... 479.
⑦Stingray ADB (platinum or black). ea. 79.

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- 8446 MVP Mouse (MVP-1) 89.



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- 8990 ⑦ProModem Ultima Home Office—V.32bis
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- 9830 ⑦MAC101E 126. 2384 with QuicKeys 149.
6901 Switchboard (modular keyboard) 159.

★ Everex ... 30 day MBG

- 1144 ⑦Silhouette Trackball 1.0 (ADB Macs).. 78.

GDT Softworks

- ⑦BetterWriters 1.01 (software drivers).. 39.
2499 ⑦PowerPrint 94.

Hewlett-Packard

- 6514 HP B&W DeskWriter (w/cartridge) 479.
2964 HP Color DeskWriter C (w/color cart.)... 849.
3596 HP ScanJet IIc (color) 1599.
6754 HP LaserJet III (requires kit)..... 1599.

★ Kensington ... 30 day MBG

- 2547 ⑦Turbo Mouse 4.0 ADB 107.

Kraft Systems

- 7519 KM30 Trackball 42.

★ Logitech ... 30 day MBG

- 1671 ⑦MouseMan .. 77. 1672 ⑦TrackMan ... 89.
5082 ⑦ScanMan Model 32 G-Scale Scanner 299.
7112 ⑦FOTOMAN w/Digital Darkroom..... 639.

★ MicroSpeed ... 30 day MBG

- 2807 ⑦MicroTRAC ADB (for SE & II family) .. 75.
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★ Microtek ... 30 day MBG

- 1978 ⑦Scanmaker 600GS 849.
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- 1486 MacSpeakers (two, stereo) 169.



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- 5525 Quicktel Xeba M9624XV—Send and
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★ Sophisticated Circuits ... 30 day MBG

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- 4994 ⑦LightningScan 400 359. 3107 Pro 256 499.

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9437 2 MB SIMM for Ilsi or II LC ea. 65.
7437 4 MB SIMMs (80ns) 125. 7600 (set of 4) 479.

★ Applied Engineering ... 30 day MBG

- 2532 QuickSilver Accelerator for the Ilsi 269.
1971 FastMath LC 109.

- 8361 ⑦1.44 MB High Density Drive 229.
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★ DayStar Digital ... 30 day MBG

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8556 ⑦FastCache for Mac IIci..... 265.

- 3401 ⑦FastCache Ilsi 299. 3389 with FPU 369.
1613 ⑦FastCache 040 (for Quadra)..... 349.

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- 2224 90 MB Transportable (reqs. interface). 679.
2467 90 MB Gold Std. Rem. Cart. (Qty. 3)... 439.

- 7789 ⑦Mac 1B Interface (w/Central Pt. Backup) 39.
2466 ⑦Mac 2B Interface (with Retrospect) 99.

MASS Microsystems

- 2605 DataPak 45 649. 2599 DataPak 88.... 849.

Diamond Drives:

- 2973 120 MB HD . 639. 2972 210 MB HD 1029.
2969 320 MB HD 1499. 2952 510 MB HD 2119.

- 5903 120 Internal. 469. 5901 210 Internal. 839.
5909 320 Internal 1289. 5904 510 Internal 1899.

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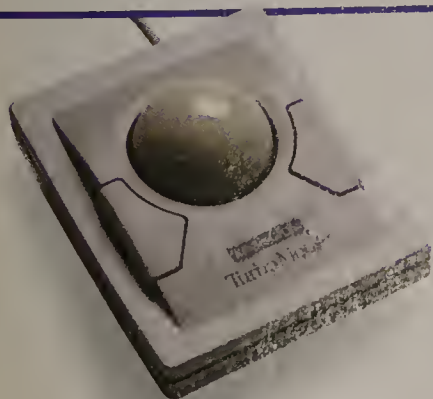


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5290 ⑦ *Plus Drive*—100% FDHD compatible drive for the Plus and SE. The Plus Drive installs through the floppy connector and doesn't require a SWIM chip upgrade..... **\$309.**

5898 1" 80 MB Port...449. 5899 120 MB.. 559.
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3662 320 MB Port. 1549. 3659 510 MB Port. 1999.
3657 HitchHiker Portable Drive (40 MB)..... 479.
3656 HH (80 MB) 749. 7008 HH (120 MB) 899.
7018 Floptipak 21 MB Drive..... 559.
7006 Flopticart (21 MB)..... 35.

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5535 MDS 88 SyQuest w/Norton Utilities 2.0 599.
5529 44 MB Cart.(3 pak) 199. 5528 (5 pak) 329.
5531 88 MB Cart.(3 pak) 312. 5530 (5 pak) 512.

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2262 Xceed Color 30 Card (SE/30)..... 279.
2260 Xceed Gray-Scale 30 Adapter Card..... 75.
3668 Xceed Macro Color 30 24-bit Video Card 489.
Peripheral Land, Inc. (PLI)
6432 3½" Optical Media 65.....1866
Quick SCSI Card (requires cable)..... 319.
8335 PLI TurboFloppy 1.4..... 295.
8327 PLI Infinity 40 Turbo (removable)..... 599.
9752 PLI Infinity 88 Turbo (removable)..... 729.
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1501 DoubleUp with ⑦DiskDoubler 3.7 179.

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3298 3½" HD Disks (10) .. 15. 6375 (30)..... 42.
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8185 QD2040..... 14. 1895 QD2120..... 21.

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5528 44 MB Cartridge (5)... 329. 9728 (10) 649.
3603 88 MB Cartridge (1).... 107. 5531 (3) . 312.
5530 88 MB Cartridge (5)... 512. 3600 (10) 999.

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7600 4 MB SIMMs (80 ns, set of 4)..... **479.**
4748 Mac Toolkit (Plus, SE, Classic)..... **8.**

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Apple Computer
9773 StyleWriter Ink Cartridge 22.
7748 Personal LaserWriter Toner Cartridge .. 87.
1115 LaserWriter II Toner Cartridge..... 105.

★ **Avery ... 60 day MBG**
7050 Avery 5660 (1" x 2 5/8"-Clear Adrs.-Laser) 32.
5392 Avery 5196 (3½"-Disk Labels-Laser)..... 29.

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6763 Mac SE Anti-Glare Filter..... 52.
3623 Apple 12" Anti-Glare Filter..... 63.

★ **Moustrak ... 60 day MBG**
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2693 Moustrak Pad Low Friction (9" x 11").... 10.



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that exposure to VDTs was considered. The statistics in this paper aptly illustrate the computing truism: "Garbage in, garbage out."

The readers of *Macworld* would receive more accurate information about electromagnetic theory and safety if you would follow the methods of archival journals and have properly educated reviewers, such as Dr. Lin, review manuscripts from entertainment writers of educational background, such as Paul Brodeur, before publication.

*J. Robert Ashley
Tampa, Florida*

"Occupational Exposure to Electromagnetic Fields and Breast Cancer in Men" appeared in *The American Journal of Epidemiology's* August 15, 1991, issue. Paul Brodeur specializes in medical and science writing and has won many national awards for his reporting on the dangers of asbestos, the hazards of enzymes in household detergents, the destruction of the ozone layer, and the effects of electromagnetic emissions.—Ed.

Toaster Image

I FOUND THE ARTICLE "3-D: Structure, Surfaces, and Movement" in the February 1992 issue to be most informa-

tive. I did note a moderately surprising omission from the list of programs covered—LightWave 3D. For those not familiar with LightWave, it is the 3-D modeling, rendering, and animation package bundled with NewTek's Video Toaster. While I understand that the Toaster may be considered an Amiga product (after all, the original stand-alone Toaster for the Macintosh was an Amiga in disguise), it is an extremely popular Mac peripheral and hence of great interest to many Mac enthusiasts. I myself use the Toaster-based LightWave. Consequently, when I saw the test scene rendered by nine of the reviewed packages, I felt compelled to duplicate it in LightWave to show off its capabilities:



*Mark Thompson
Merrimack, New Hampshire*

Mirroring Support

THINK IT WAS UNFAIR OF *MACworld* to print the letter from William Raiford reporting that a dealer had rated the Mirror 210 as a worst buy (*Letters*, May 1992).

You have repeated what is merely hearsay from an anonymous source. Since Mirror sells factory-direct, the dealer who was quoted is very likely in competition with Mirror, and can hardly be thought of as an objective source.

My own experience with Mirror drives and with the technical support provided by the company has been excellent. You have done Mirror Technologies a disservice.

*Bob Nichols
Kapaa, Kauai, Hawaii*

Letters should be mailed to *Letters, Macworld*, 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include a return address and a daytime telephone number. We regret that, due to the high volume of mail received, we are unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*. m

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Circle 216 on reader service card

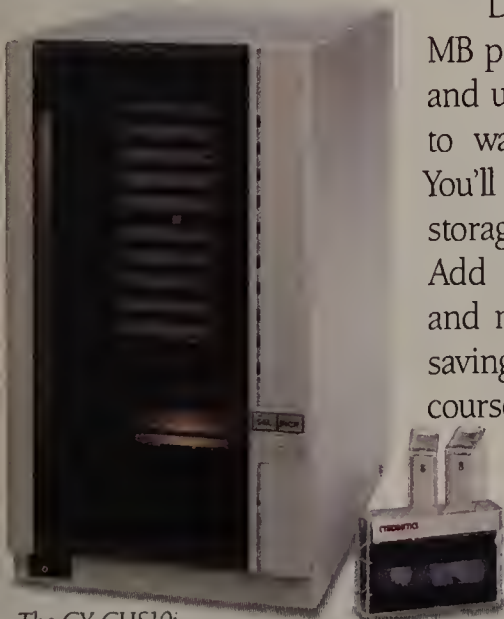
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Behind Macworld's Graphics

BY CATHY ABES

Artists: *Macworld* senior designer Arne Hurty worked closely with San Francisco photographer Alex Varnes to create a photo-illustration showing the internal workings of a film recorder for this month's feature "Slides while You Wait."

Hardware: Mac Quadra 700 with 8MB of RAM and a 160MB internal hard drive; RasterOps 19-inch color monitor and 24-bit graphics board; BarneyScan CIS 4520 RS Scanner.

Software: Adobe Photoshop 2.0.

How It Was Done:

The process began with Varnes taking two pictures of the Agfa PCR II film recorder—one with the external case on and the camera showing, and another with the case off so the internal parts were exposed—keeping both Varnes's camera and the film recorder in exactly the same positions to ensure perfect registration between the two shots. For the photograph showing the camera, Varnes double-exposed his film to make the roll of film inside the film re-



The photo/illustration composite that appears on page 148.

recorder camera visible (as if the camera back were transparent). To do this he shot the film recorder with the camera back closed and then reexposed the frame with the camera back open, this time lighting just the film in the film recorder's camera. The double-exposure technique worked well because the shininess of the film in the second exposure stood out against the black of the camera in the first exposure.

Varnes also photographed a color wheel provided by Agfa, making sure he had the wheel angled correctly to simulate its position inside the film recorder.

The photos were scanned using the BarneyScan scanner. Hurty used Photoshop to superimpose the scanned image of the color wheel over the image of the film recorder, positioning the wheel where it would normally be. In order to expose more of the wheel, he drew a cutaway by removing part of the housing with Photoshop's lasso tool and using the clone tool and the copy and paste commands to reveal what would normally be hidden behind the color wheel. Hurty first cloned the background col-

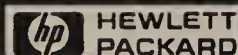
or, then copied and pasted background details, and touched them up with the pencil tool. Then he opened the image of the color wheel and selected all the background areas (everything but the color wheel itself), made these white, and copied the whole file. After selecting the area where the color wheel was supposed to go, including the cutaway area, he pasted in the color wheel image. Then using Paste Controls (under the Edit menu), he set the opacity of the pasted

color wheel to 50 percent so that the colors in the wheel would be translucent (as they are in actuality). Still in Paste Controls, he clipped out the white, which eliminated the background around the color wheel, leaving only the wheel itself.

Next Hurty opened the original color wheel file, selected all the color circles in the wheel, and made them white. Then he copied the color wheel again and pasted it directly over the previous paste but this time at 100 percent opacity. That made the color wheel opaque, but because he

continues

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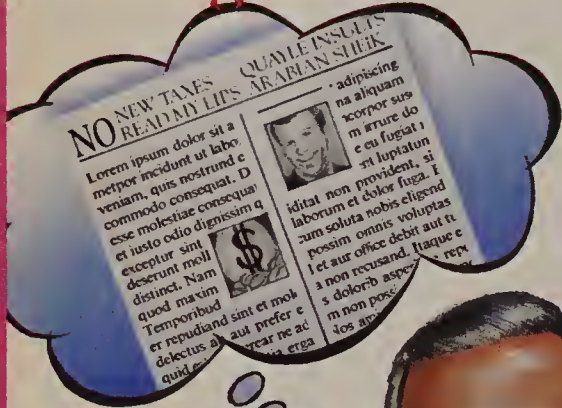
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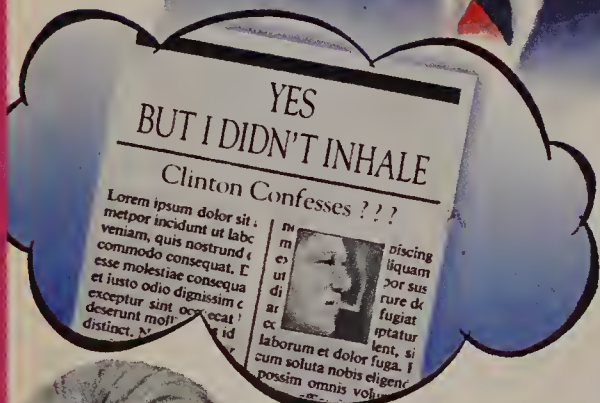


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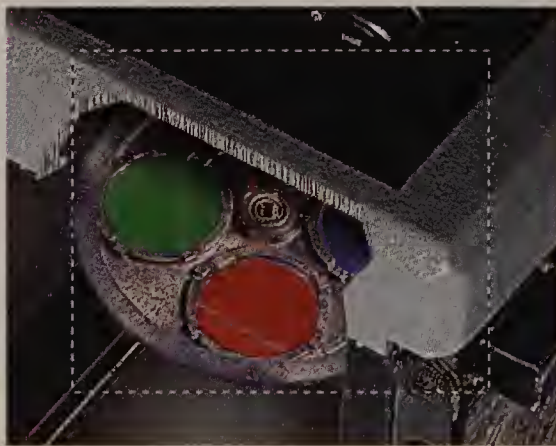
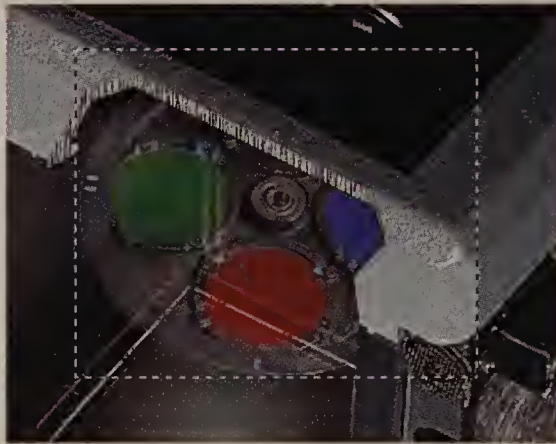
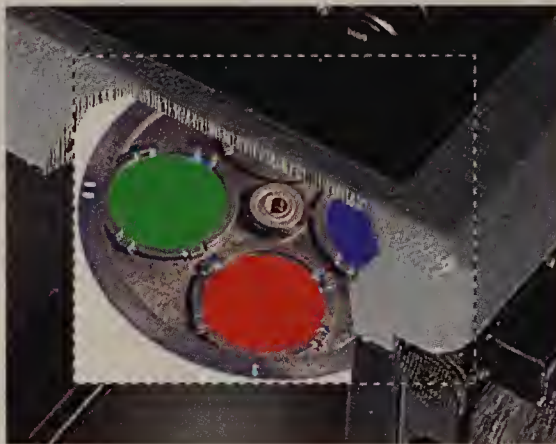
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The three original photos of the film recorder's internal parts, the film recorder, and the color wheel.



The pasted color wheel at 100 percent opacity (top); after Hurty made it translucent (50 percent opacity) and clipped out the white background (middle); pasted again at 100 percent opacity with the white circles clipped out so the translucent color circles show through (bottom).

clipped out the white, the color circles stayed translucent.

Then, using the airbrush tool, he drew a beam of light from the CRT through the red color circle and up to the camera. Now Hurty was ready to paste the internal parts of the film recorder into



The selection made with the elliptical marquee and lasso (top); the mask created by the selection (saved in the alpha channel), which Hurty used for pasting in the film recorder's internal parts (bottom).

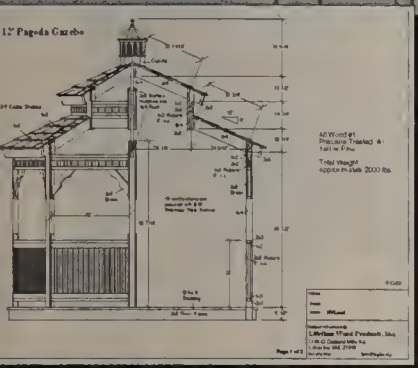
the image of the outside of the film recorder. First he used the elliptical marquee to select a large oval-shape area into which he planned to paste the internal parts, and set the selection's feather edge to 64 pixels, to create a very soft edge. But he wanted a hard edge around the top of the casing, so holding down the ⌘ key and using the lasso tool, he deselected the top of the oval. After selecting the entire image of the internal parts, Hurty pasted it into this selection. The result is that in the center of the oval, the pasted-in image—at 100 percent opacity—looks sharp, but closer to the fuzzy edges, the internal image gradually loses its opacity until it completely blends into its surroundings—the film recorder's casing. **m**

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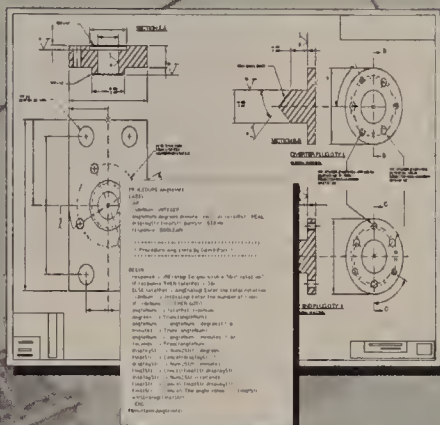
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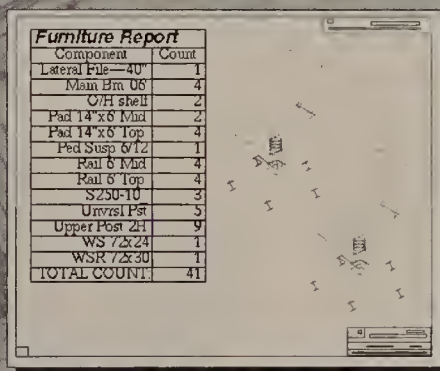
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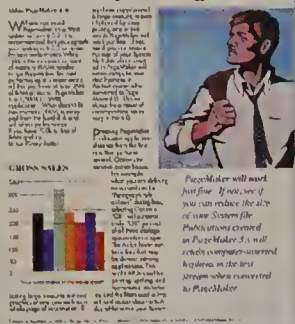


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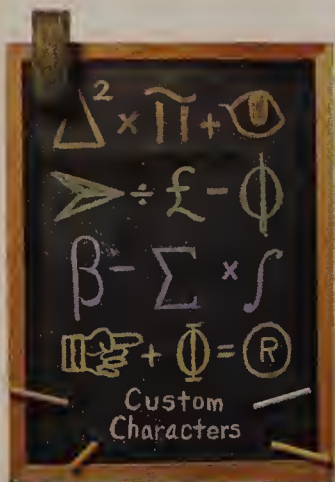
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Fighting the Code War

BY STEVEN LEVY

IN MARCH, AT A CALIFORNIA CONFERENCE center called Silverado, Apple Computer revealed its grand plan for system software. One of the key architects was networking wizard Gursharan Sidhu. He explained that in the new world of computing, all roads lead to digital collaboration, but that to date, the technology for true collaboration has been deficient. He contended that several key components have yet to be provided, and none is more important than the implementation of trust. If people are to participate in what Apple calls a truly Open Collaborative Environment (O.C.E.)—if they are to take advantage of the fruits of being connected to their fellow workers, their banks and merchants, and even the world at large—the privacy of their data must be protected.

"Privacy is concerned with wiretapping," he explained. "Many of you have heard in the news about how various people are listening in [to cellular phone conversations]. . . . Well, the same thing happens and can happen pretty easily on networks." Sidhu explained that Apple would prevent this from occurring by implementing an easy-to-use form of encryption. This would automatically encode all communications sent into the world by users. The recipients would have the means to decode this data. Anyone trying to intercept it would get nothing but gibberish. Letters, messages, and documents would be wiretap proof. Or so Sidhu implied. Then came the question-and-answer session. And suddenly things were not so simple.

First, someone asked whether Apple would be allowed by the U.S. government to export such a product. Sidhu acknowledged that this was "a very sophisticated and complex area," but expressed confidence that Apple would be able to obtain a license for export. He reported that the National Security Agency (NSA), the arm of government that oversees encryption schemes, cracking codes, and international surveillance, had reviewed Apple's encryption scheme and said it was fine. This led to a question concerning the strength of the coding technique with which Apple was planning to protect its users' privacy. Could the NSA pluck the encrypted code—the gibberish—off the

wires and switch it back to its original form? Sidhu claimed he did not know. He said, however, "I can assure you that if they can decrypt, it's at enormous cost. And only people who have access to the taxpayers' till can afford it. I think a commercial venture would have a very difficult time cracking this."

Listening to this exchange, it would be understandable for someone unfamiliar with these issues to think he or she had wandered through some sort of tear in the fabric of logical discourse. What do export requirements have to do with Apple's system software? Why did Apple submit O.C.E. to a government agency in charge of monitoring overseas surveillance? If the codes that Apple used were supposed to guarantee privacy, why couldn't Sidhu guarantee that no one could break them?

You can't blame Sidhu or Apple for these contradictions. The so-called technologies of trust have become a battleground for privacy conflicts in the 1990s. These skirmishes are accelerating at a drastic pace. Companies like Apple—and, ultimately, we as their customers—are caught in the cross fire.

At stake is our privacy. "The need for encryption has increased dramatically in the last couple of years," confirms Karen Casser, director of public policy and legal affairs for the Software Publishers Association (SPA). Everything from trade secrets to personal financial transactions to confidential medical records will be dispatched by keyboard and flung into the data void, susceptible to interception and tampering—unless they are protected.

The problem is that the U.S. government believes that granting us the security of encryption will favor our enemies and foster crime and terrorism. The feds are pursuing a different ideal. In this vision, the entire system of communications will be redesigned explicitly to accommodate the government's desire to crack our codes and wiretap our communications.

Tales from the Crypt

ULTIMATELY, THIS IS A CONFLICT born of the march of technology. For centuries, encryp-

tion has been an esoteric subject, the domain of armies, spies, and amateur cryptographers who drew on wormholed pipes while deciphering puzzles. Until recently all cryptographic roads led to the NSA, which in 1952 was created by secret order to encrypt government secrets and break the codes of other nations.

The NSA's Fort Meade, Maryland, headquarters house the world's most extensive bank of computers, devoted to cracking codes. The NSA is the "blackest" of all agencies; for years no one in government ever admitted its very existence, and the Beltway joke was that its acronym really stood for No Such Agency. The NSA still operates under extreme secrecy, on the assumption that our enemies would glean useful insights from the release of even seemingly innocuous information about NSA activities. It is, however, widely understood that the NSA routinely monitors all international communications—phone calls, cables, radio messages. Everything from a shortwave broadcast in Siberia to a Mother's Day call to Aunt Tillie in Australia is likely to come under the scrutiny of NSA's net. The NSA is limited to foreign intelligence, though according to James Bamford's "The Puzzle Palace," the agency overstepped those boundaries during the sixties, maintaining "watch lists" of antiwar protesters and alleged mobsters and drug dealers.

It has been long assumed that the NSA's ability to crack codes and monitor international communications was unparalleled. But the computer revolution changed the ground rules. With access to heavy processing power, a new breed of cryptographers emerged; they were able to research and develop new coding techniques that, for the first time, were not under direct government control. They developed powerful scrambling and decoding algorithms, encryption technologies that could be licensed by businesses and individuals.

There are two important encryption technologies: Data Encryption Standard (DES) and RSA (named after the initials of its three inventors) al-

continues



*Is your
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gorithms. Both depend on using mathematical keys to encode and decode the plaintext messages. The strength of the system depends on the size of the keys, that is, the number of bits. The bigger the key, the harder it is to crack the code. In 1977, the government declared DES a national standard. Some cryptographers claim that the NSA intentionally weakened the standard so that it could more easily crack the codes itself.

The wave of the future seems to be

the RSA codes, developed in academia and now administered by a private company, RSA Data Security, of Redwood City, California. Some RSA codes use what is called public key encryption: this provides all users with two different strings of numbers—a private key and a public key. The private key is known only to the user, but the public key is freely distributed. Someone sending a message to the user scrambles it by way of the user's public key—but the user can read the

message only by unscrambling it with the private key. This scheme eliminates the messy problem of distributing one's secret key to the recipient of a message. And when a message is scrambled by the combination of the two keys, it is devilishly hard for an outsider to unscramble—when the key is a large one, say, of 512 bits, experts deem it virtually uncrackable.

Against the Wind

OBVIOUSLY, WIDESPREAD IMPLEMENTATION of RSA codes with large key sizes would provide terrific privacy. The ideal—and it is quite feasible—would be a universally accepted standard in which cryptography is smoothly integrated into system software so that one has virtually perfect protection—without computer users even knowing it's there.

But consider this from the NSA point of view. Its job, as privacy expert John Gilmore puts it, is “wiretapping the world.” Instead of a flow of words and numbers from which the agency could identify messages of compelling interest, the data traffic would all be a hellish thatch of jabberwocky. Even when the agency isolated a string of nonsense it wanted to decipher, it would have to devote many hours or days to cracking the code. The NSA's job is to conduct surveillance, “to look for needles in a haystack,” explains Jim Bidzos, president of RSA Data Security. Encryption schemes “make the haystack bigger—they might not find the needle.”

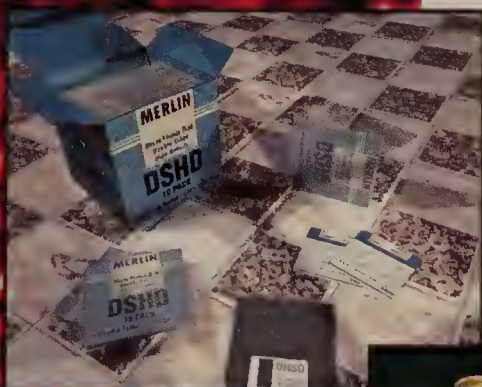
Considering this, it is no surprise that the government, apparently spurred by the NSA, is trying to slow down the march of encryption. It does this by use of export restrictions. Encryption technologies are classified as munitions—military weapons. Like nuclear-bomb casings and F-16s, software that includes encryption cannot be exported unless the government specifically approves.

Currently, to export any software that uses encryption techniques, a company like Apple, Lotus, or Microsoft has to submit its encryption schemes to the State Department, which in turn consults the NSA to see if release of the product into foreign hands will result in “a threat to national security.” Anything with particularly strong security—which seems to mean a level of encryption that requires the NSA's computers to break a sweat—gets the Big Nix.

The catch is that by limiting what goes overseas, the Feds are really limiting *all* software, even what I use for sending a column to my editor—from Massachusetts to California. “Almost every one of the large computer companies get more

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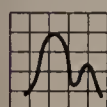
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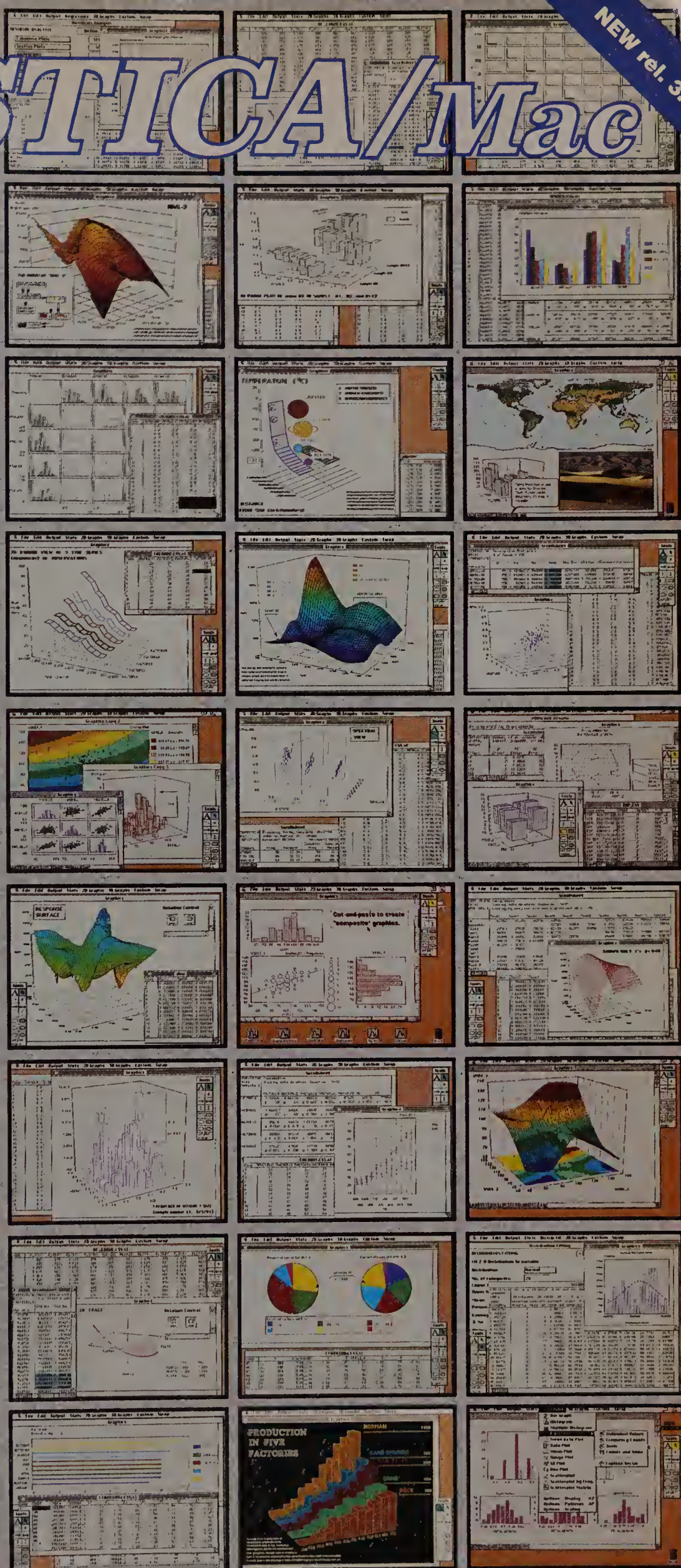
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than half their revenues from overseas," says Jim Bidzos. "Most companies will not maintain two different products just to have different levels of security for domestic and overseas customers. The net effect of the policies of the NSA is to very consciously encourage use of the, quote, 'export' standard—for everyone."

This is problematic enough. But the worst of it is that the export standards don't seem to do what they are intended to do—keep encryption away from our

enemies. The encryption technology that the NSA is trying to contain is already in widespread circulation. On the streets of Moscow, for instance, one can buy Cryptos, shrink-wrapped encryption software that uses both DES and RSA algorithms—at a strength that U.S. companies cannot export abroad! As John Perry Barlow of the Electronic Frontier Foundation has noted, attempts to restrict encryption algorithms "are like trying to legislate against wind."

Compromising Positions

YET THE NSA CONTINUES ITS CRUSADE to limit the level of security offered by companies like Apple and Microsoft. When developing software with encryption technologies, companies must appear at the State Department, hat in hand, and agree on the level of privacy the software will provide. Of course, this level is watered down from the more secure standard the company would use if the export requirements did not exist. In short, the software becomes less effective. The process is also expensive and time-consuming. But if a company doesn't go through it, it can't sell its product overseas.

Unhappy with the situation, the SPA hoped to overturn the export restrictions by legislation, and found sympathetic ears in Congress. But the Bush administration has stated its intention to veto any such action. So the SPA has been negotiating a compromise with the NSA that will allow expedited export approval—but will also essentially formalize a standard for all software, whether domestic or international. One of the NSA's demands is that the technical details of the agreement not be published in the *Federal Register*, as is customary when such standards are set, but sent to Congress as classified information. This would prevent independent cryptologists from verifying precisely how much effort it would require to break the codes. But since the memo was widely leaked, it is now known that the SPA compromise mandates no more than a 40-bit key for the RSA algorithm approved for export. (At press time, the compromise was still not finalized.)

The shiny side of the coin is that the NSA is willing to compromise as far as it has—the very act of negotiation is a departure for the top-secret agency. And the level of security we're talking about here goes far beyond Captain America's decoder ring. Apple, for instance, has licensed several algorithms from RSA for its encryption scheme. Though the scheme it chose to use was by no means RSA's most secure system—which would never stand a chance of export approval—it is still considered fairly strong encryption. Yet cryptographers have alleged that using a brute-force approach (akin to a pickpocket with your ATM card trying every possible four-digit code to withdraw money), supercomputers can crack the SPA codes within hours.

Apple's proposed O.C.E. standard, which reportedly uses a 64-bit key, is slightly stronger, but clearly it can be broken. "It's false security," contends David Banisar of the Computer Professionals for Social Responsibility. "If the NSA can

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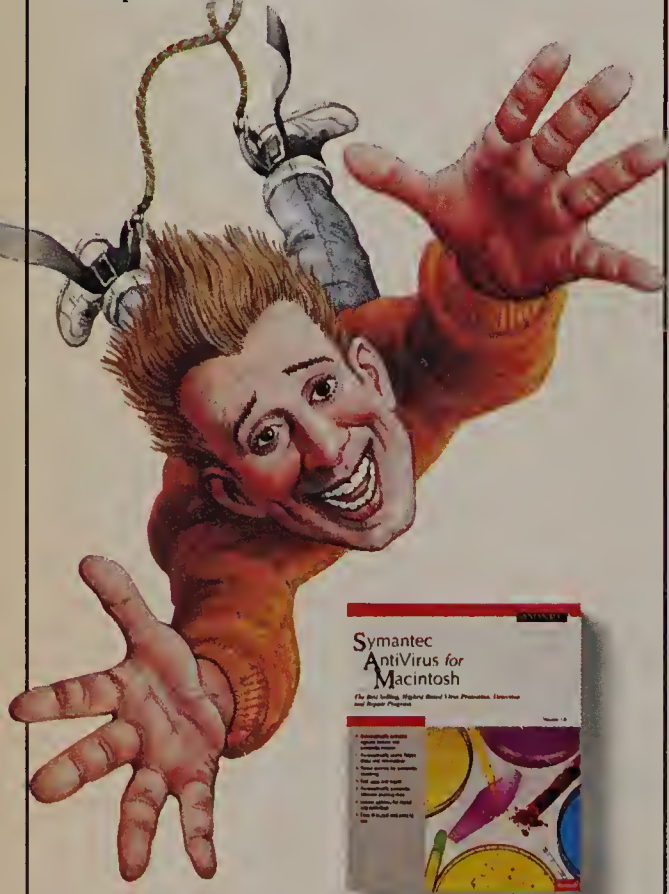
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Tap Dancing

THE ISSUES IN THIS BROUHAHA ARE illuminated by an outbreak on another front in the privacy wars. This is *digital telephony*, the future of the telephone wires. Over the next few years, the phone companies will convert to complicated digital communications technologies. The FBI claims that the switch will make it more difficult to conduct legal wiretaps. The problem, according to a government document, "endangers the safety of the American public." It would seem that the solution lies in developing technology that allows phone companies to provide law enforcement access to the lines selected for wiretaps. But the government has another idea—redesign the whole system! The Justice Department, with the vociferous support of FBI Chief William Sessions, has proposed to Congress a bill that, at an estimated cost of \$300 million, would cripple the technology so that government could wiretap in the future as easily as it does today. The cost would be borne by telephone ratepayers.

Furthermore, the FBI's proposed amendment to the Communications Act of 1934 provides that any new communications system—whether a telephone system or a computer network—would also have to be designed with easy wiretapping in mind. Critics have noted that by designing our technology to accommodate surveillance in a relatively infinitesimal number of cases—in 1990, there were only 872 court-approved wiretaps in the United States—we would be making the entire system more vulnerable to illegal eavesdropping and sabotage. (As in the current case of cellular phones, which can be monitored by any dolt with a scanning radio.) It would not only be the FBI who found our messages easier to wiretap, but also illegal eavesdroppers like foreign governments, industrial spies, white-collar criminals, and high-tech stringers from sleazy tabloids.

Under the proposed Digital Telephony amendment, it would literally be a crime for a company to produce technology that provides people more privacy than the Justice Department considers appropriate. All communications technologies, from online services to handheld personal data assistants, would have to be designed specifically to accommodate surveillance. As one critic put it, it is as if the government required furniture makers to install microphones in their lamps and sofas so that, upon obtaining a

court order, the FBI could switch them on and listen.

Whom Do You Trust?

THE IRONY OF ALL THIS IS THAT ANYONE consciously trying to elude the NSA or FBI eavesdropping—spies, terrorists, or Oliver Stone brainstorming his next movie—will have no trouble finding encryption algorithms that far exceed the level of privacy offered by the SPA compromise. However, I suspect that the rest of us, the vast mass of users, will meekly settle for whatever level of security we are given. Though we will read and hear a lot about encryption in the next few months and years, the subject will always be a bit too abstract for most people. Who's going to know or care what the difference is between a 40-bit encryption key or a 512-bit key, or the meaning of an RC-4 algorithm? As long as companies like Apple offer some sort of protection, users will assume that their messages are safe. Just as networkers are lax in changing their passwords, only a very few will be strident in demanding heavy-duty algorithms. The result will be a variation on the gun-control chestnut: When true privacy is outlawed, only outlaws will have privacy.

When it comes to entrusting our secrets to digital technology, we've only dipped our toe into the surf. Over the next few years, we will be pushed full-body into the water. We will conduct our business affairs online, access the private information in our computers by wireless personal digital assistants, and swap our voices and even our images through the successors to the telephone. Under the circumstances, it does not seem unreasonable to ask for the best protection available.

Finally, there is the question of the degree of access to our communications to which the government is entitled. In 1928, Supreme Court Justice Louis Brandeis presciently predicted that "the progress of science in furnishing the government with means of [invading privacy] is not likely to stop with wiretapping. Ways may some day be developed by which the government, without removing papers from secret drawers . . . will be enabled to expose to a jury the most intimate occurrences of the home. . . . Can it be that the Constitution affords no protection against such invasions of individual security?"

Until that question is answered, an unsettling ambiguity will haunt the technologies of trust. Does it mean that we can trust that our communications are safe—or that we have no choice but to trust that no one is listening? **m**

STEVEN LEVY's latest book is *Artificial Life* (Pantheon, 1992).



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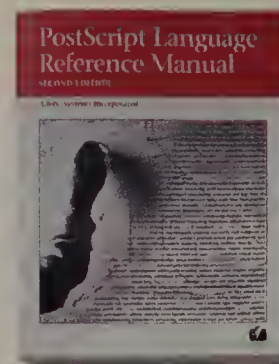
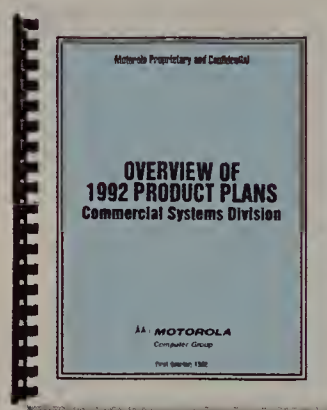
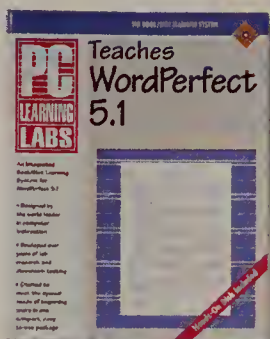
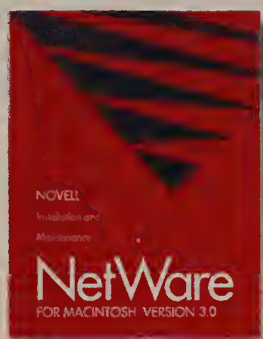
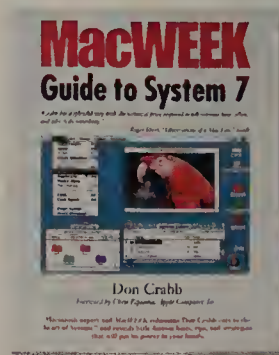
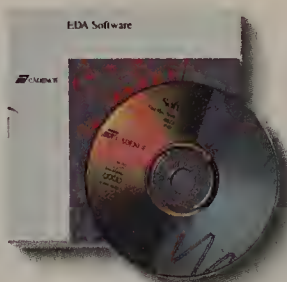
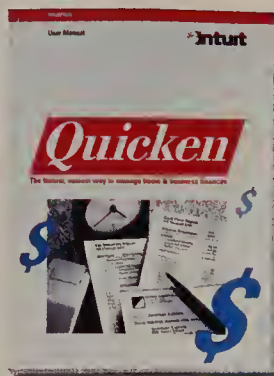


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Inside Ehman Inc.

BY DEBORAH BRANSCUM

As Michael Ehman tells the story, he was upbeat about the future of his troubled Macintosh peripherals company until December 14, 1991. On that date, Ehman says, he realized the company was fulfilling backlogged orders but not winning new sales. Or at least, not as many as the company needed to stay afloat. So early this year he put Ehman Inc. up for sale—but no one bought it. In March, Michael Ehman incorporated a new Macintosh company called Bridgette, located in San Clemente, California. In April he bid farewell to the state of Wyoming by closing Ehman Inc.'s Evanston headquarters, changing the locks, and handing the keys to his banker for access to the remaining inventory as collateral for a half-million-dollar, state-guaranteed loan.

Exactly why Ehman Inc. failed to stay in the peripherals business is fodder for another column. For now, readers should know that Ehman Inc. no longer sells peripherals and has sold the marketing rights to its Ehman Inc. and Cutting Edge product lines to Bridgette. It's a distinction that may be lost on some customers, since Michael Ehman is active in the company and Bridgette has kept Ehman Inc.'s 800 sales line, where employees answer the phone by saying "Ehman."

It is confusing. Ehman Inc., for example, isn't actually out of business and has no plans to file for bankruptcy, according to its founder, who told me that the company—which has estimated debts of some \$4 million—retains memory and consulting divisions. Meanwhile, Michael Ehman is managing Bridgette with two other executives and stressing that Bridgette will support Ehman Inc. customers as it markets Ehman and Cutting Edge products. (A press release from Bridgette says "the transition was smooth and at no time were Ehman customers left without service support.")

"I feel a moral responsibility to the customers to make sure they don't get screwed like the Jasmine customers did, and I think Bridgette is going to be able to do that," he says. "What I hope to accomplish, and I think I pretty much did, is that customers are going to get serviced

and people are going to answer the phone, and the name isn't just going to go on a garbage heap." Ehman says a royalty agreement between Bridgette and Ehman Inc. will help pay off the latter's creditors. When asked what his relationship is with Bridgette, he says, "I don't really have one. I'm just here trying to make sure that all the Ehman customers who believed in me don't get left in the dust."

In a later interview, Ehman says he is working as an unpaid consultant to Bridgette because the company can't afford to pay him. "I created Bridgette; Bridgette was my idea," Ehman says. "I got some people to put in some money, sold them an idea—hey, these [Ehman customers] deserve to be taken care of and this company can be viable. I'm part of the management team, but I'm not an employee, nor do I have ownership, because the investors have ownership—they put the money in."

Defining Support

AS EHMEN EXPLAINS IT, BRIDGETTE is going to honor warranties, with the following caveats. "If it's something we can fix, we will fix it free. If it's a subunit, the actual hard drive that fails, we'll fix it if the manufacturer honors the warranty, and they've told us they will." But don't get out your party hats yet. The warranties on some drives will have run out while they were sitting at Ehman, and later at Bridgette, waiting to be returned to the manufacturers for repair. Those drives will not be fixed for free, but Ehman says his company is willing to have them repaired at cost. Some customers, like C. David Hunt, will be out of luck altogether. In February Hunt returned a drive still under warranty to Ehman Inc., where it was lost. "Are there people who are going to get burned on this? You bet there are, but a very damn few, probably less than a couple dozen, and out of a hundred thousand customers, that ain't bad," Ehman says. "I wish it was none, but there's only so much that can be done."

Recycled Drives

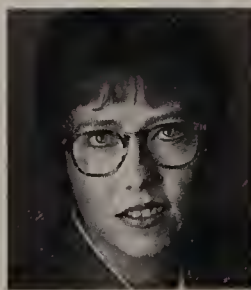
EHMEN'S STATED CONCERN ABOUT his old customers is admirable, but I found myself wondering if he was sincere. Because I had recently returned from Evanston, Wyoming, where I'd interviewed former employees about their experiences at Ehman Inc. During an earlier trip I took in the fall, workers shook my hand firmly, looked me in the eye, and assured me the worst was over (see *Conspicuous Consumer*, February 1992). But this time Ehman's office was closed, and no one had much to lose by telling me what really went on at Ehman. What they had to say wasn't very reassuring for consumers.

Take used drives. Michael Ehman denies his company sold used-drives as new. "If we had old inventory, sometimes we would have sales of used equipment where we would offer used-drive specials with a 90-day warranty," he says. "But it wasn't the policy of Ehman Incorporated to ever sell used products as new."

That's not how several former employees remember it. John Sannito started as production foreman in January 1990 and was production manager when he was laid off in July 1991. According to Sannito, used drive mechanisms removed from drives sent in for repair were often put in new cases and sold as new. "It didn't matter how old they were," says Sannito. "There were numerous instances where drives were a year or two years old."

In fairness to the company, customers sometimes received new mechanisms to repair their bad drives. And the used mechanisms were repaired and tested before they went out as new. Still, the workers I spoke to weren't very happy about the deception. "That was one of the things that really bothered me," says Helen Hodgins, who was production manager after Sannito and also worked in the formatting and integration areas between January 1988 and July 1991. "I was having to go through those drives and fix the ones that didn't work and then put them out as new drives."

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*Used drive
mechanisms
were sold
as new,
according to
former
employees*

One time parts were salvaged from several old drive mechanisms to make working hybrids that were sold as new, according to Tina Laughlin, a former Ehman employee who returned mechanisms to manufacturers for repair in the summer of 1991. "These drives were out of warranty and we couldn't get Seagate to take them back," says Laughlin. A co-worker "took them apart and he kind of mishmashed parts to get one drive to work." Some of the pieced-together

mechanisms were added to the repair pool, but some were sent out as brand-new drives, according to Laughlin.

Did Michael Ehman know about the practice? Yes, according to several employees I spoke to. Laughlin says she asked Ehman what to do with the old drives that Seagate wouldn't accept. "I wanted to know if I should sell them to companies that buy old drives," Laughlin says. "He said no, he wanted [us] to find parts that would work for one drive and

put them in a chassis and sell them."

It's an issue employees brought up to Michael Ehman a number of times, according to John Sannito. "It was my responsibility to put out the door a product that met all of our quality-control standards, that we knew was going to work," he says. "Because I knew that we didn't have real skilled, well-trained people in the repair department—the people who looked at returned drives—I wasn't totally confident that they knew there was no problem, that they had thoroughly checked it out, that they could guarantee that it was 100 percent operational. So I felt uncomfortable about putting [used mechanisms] through the line again because the problems that would develop would then be reflected as though we were putting out a poor product in the assembly area."

And how did Michael Ehman respond? "Mike's answer was basically that people paid for a drive that would do a job and we guaranteed them that it would work for a certain period of time," says Sannito. "He didn't think that was deceitful or dishonest to the customers."

Mary Christensen was materials manager between May and September 1990, responsible for product ordering. She suspected used drives were being recycled "because if I am ordering new parts in, and they come into my inventory, and the production is still high and they are not utilizing the parts out of inventory, where did the parts come from that were going into the production floor? And that was my question to Mike." Ehman, she says, laughed and told her not to worry about it.

So apparently, recycling used drives and selling them as new wasn't a brief, emergency response to difficult times. "It was always that way. It was status quo," says Sannito.

Alas, used drives sold as new weren't the only problem consumers might have encountered when dealing with the chaos that was Ehman Inc. Former executives say the company did not charge credit cards until the day after a product shipped, but some people fell through the cracks.

"We would promise [customers] dates when their drives were going to be shipped, and we would bill their credit cards, and they would wait for months and finally get fed up with it and want a refund," says Shirl Ashworth. "And we didn't have the money to refund them." Ashworth worked at Ehman Inc. between October 1990 and October 1991 in many areas, including customer service, receiving, and as Michael Ehman's assistant for a time. "I would always handle the people that would get really irate," she says. "Just basically lie to them. Just to get them paci-

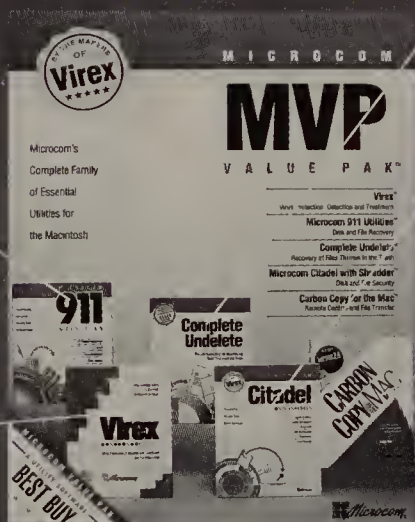
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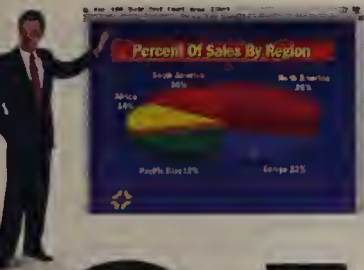
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fied until we had the funds to give them their money back." Unfortunately, "I tried to get their money but we just didn't have it. We'd already used it. It was gone."

Misty Johnson worked in customer service, technical support, and sales between 1989 and 1992. "People would ask, are you going under, and we knew [the company] was, but we were told to deny that. We lied about delivery times, we lied about the product, that it wasn't something refurbished, that it was brand new and of high quality."

Once the customers had bought a product, technical support could be spotty. "There were times where there were hours or even days before you could reach our tech support," says Anne DeClercq, who worked in marketing. "It was important to sell, sell, sell, and if anything was wrong, there was nobody there" for the customers.

Bridgette's Future

MICHAEL EHMAN DENIES THAT USED drive mechanisms were recycled and sold as new. Michael Ehman denies that he has any ownership in Bridgette—like a friendly uncle, he's just in the neighborhood to help. Heaven knows, Bridgette may need help. John Cox, the company's

short-tenured president, resigned in mid-May. Before he left, he told me that most of Bridgette's customers, like Ehman's before it, are corporations and schools. Such customers buy on net-30 terms—that is, they pay for their orders within 30 days of receipt, and often, more like 60 days. That could be a problem if the company needs operating capital. Michael Ehman claims cash flow is not a problem—"I built a business to \$30 million with an initial investment of \$5000," he says. "So that's not really a consideration."

Perhaps not, but at least one wary supplier is treating Bridgette the way it treated Ehman Inc.—by demanding prepayment for parts. Bridgette is currently operating out of the offices of Questronex, which began manufacturing and shipping Ehman- and Cutting Edge-labeled drives to customers last October in an arrangement with Ehman Inc. Now Questronex is doing the same for Bridgette.

When I visited Bridgette in May, I counted six employees, not including Michael Ehman, unpaid consultant. The company was incorporated in Nevada, and although a list of officers was due to be filed with the secretary of state's office

on May 4, none had been as of May 29.

At press time, Michael Ehman's financial dealings are being investigated by the Uinta County, Wyoming, county attorney; Ehman says he has done nothing wrong. And there may be no legal reason, really, why a man can't start a company, run up debts, and start a new company somewhere else—some successful businesspeople have exactly that track record. But the people of Evanston, population 12,177, are angry. Anne DeClercq left Ehman Inc. to become county clerk for Uinta County and says the State of Wyoming is facing employee cutbacks. "We're in real financial straits. And then someone like Michael Ehman comes along and says sorry, my company went under and I don't have to pay it. I just don't think it's fair."

Fair or not, Michael Ehman is starting over with Bridgette. It's up to you to decide if you trust him, and are willing to give him and Bridgette a chance. **m**

Research assistance by CAROLYN BICKFORD.

Send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

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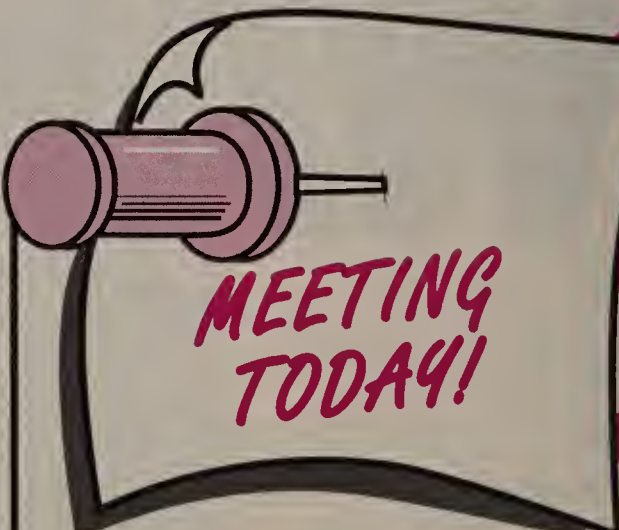
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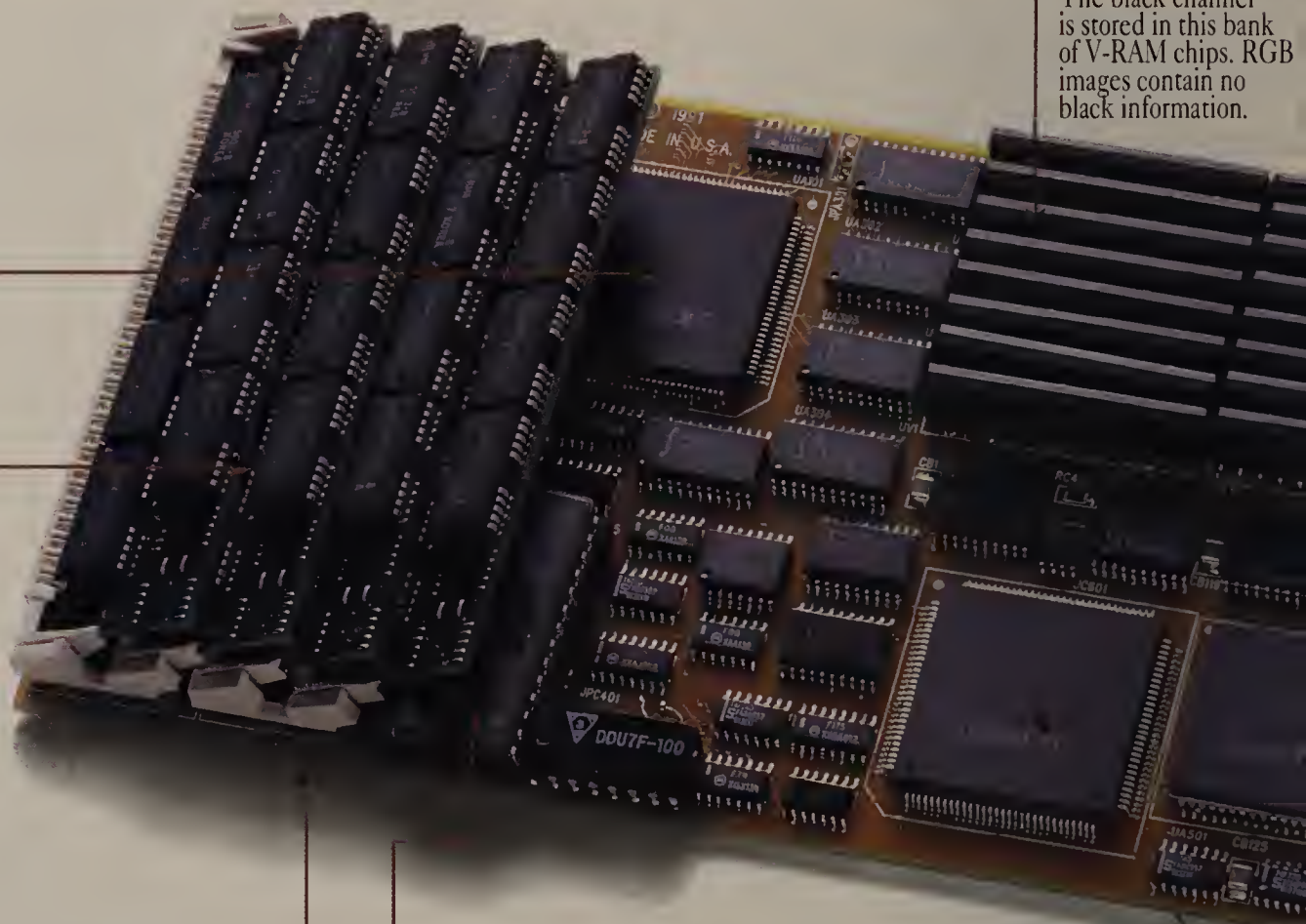
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The ProColor 32 dramatically reduces the time and memory required to convert images from CMYK to RGB format by eliminating the need for time-consuming software conversions. Images in cyan, magenta, yellow and black (CMYK), the color space used for color separations and printing, are converted to red, green and blue (RGB) for display on your monitor using VLSI chip technology. By performing the CMYK-to-RGB conversions on-board, the ProColor 32 accelerates the conversion and eliminates the need for software to store both CMYK and RGB data in system or hard-disk memory.



ADVANCED 9-BIT DAC

The 9-bit digital-to-analog converter (DAC) allows for gamma correction to be made without any on-screen color degradation.



In a CMYK image, the magenta channel is stored here. When working with an RGB image, the blue data is stored here.



In a CMYK image, the yellow channel is stored here. When working with an RGB image, the green data is stored here.



In a CMYK image, the cyan channel is stored here. When working with an RGB image, the red data is stored here.



The custom ASIC chip instantly converts CMYK data to RGB for screen display, bypassing time-consuming software conversions.



RGB MODE

The ProColor 32 supports both RGB and CMYK modes, providing complete compatibility with existing RGB software as well as simultaneous on-screen display of both RGB and CMYK information.

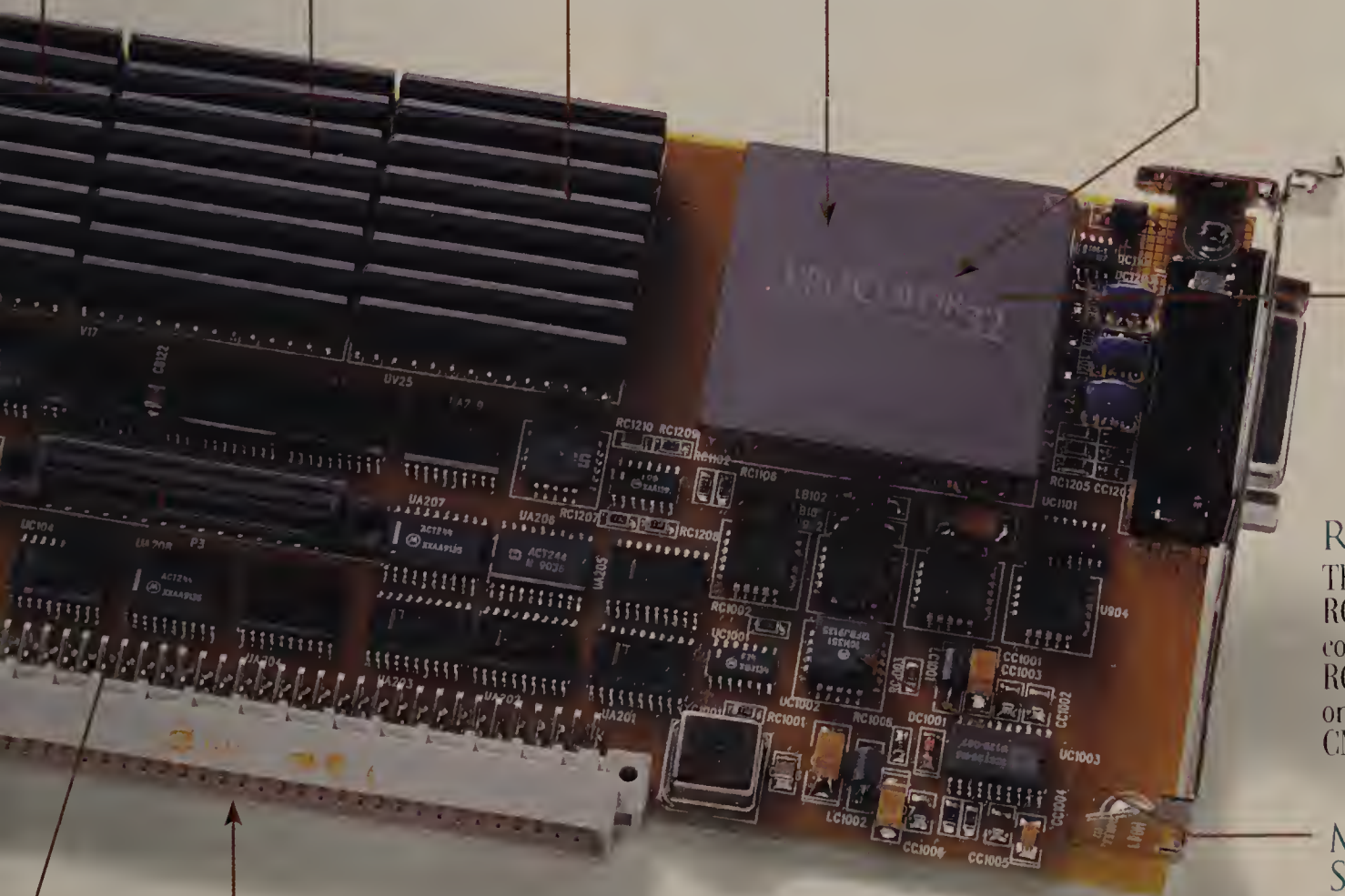
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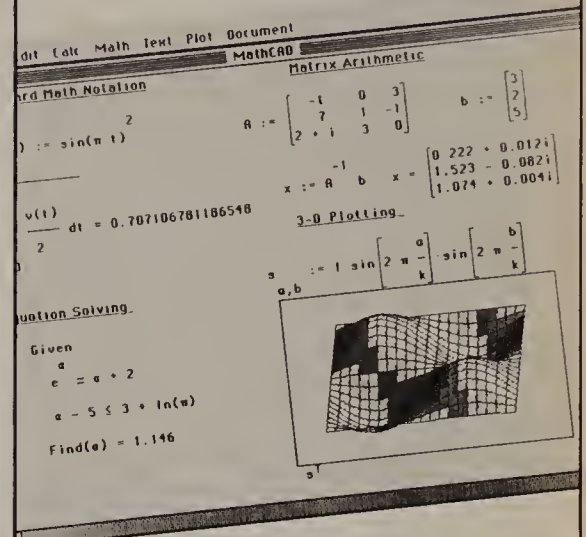
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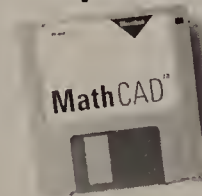
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GRACELAN	2.0	1MB/6.0.5	*	
GRACELAN UPDATE MANAGER	1.0	2MB/6.0.5	NA	
GRAMMATIK MAC	2.05	1MB/6.0	\$15	
GREAT GANTT	1.4	1MB/6.0	*	
GREAT PLAINS ACCOUNTING SERIES	6.0	1MB/4.2	*	
GREATWORKS	1.0	1MB/6.0.2	1/92	NA
GUIDE	2.0	512K/4.1	\$50	
HAND-OFF II	2.2.5	2MB/6.0.2	FREE	
HELP	1.0.1	1MB/6.0	2/92	FREE
HYPERCARD	2.1	1MB/6.0.3	\$49	
HYPERDA	2.0	512K/3.2	*	
ICON-IT	2.1	1MB/6.0.2	*	
IF:X FORMS DESIGNER	1.1	1MB/6.0	FREE	
IMAGE GRABBER	3.0	1MB/6.0	2/92	\$18
IMAGESTUDIO	1.7	1MB/6.0	\$99	
INFINI-D	1.1	4MB/6.0.4	9/91	FREE
INFOLOGIC ENVELOPE	1.1C	512KE/4.0	\$5	
INITPICKER	2.02	1MB/6.0	\$10	
INSIDE OUT	II	1MB/6.0.2	*	
INSIGHT EXPERT ACCOUNTS PAYABLE	2.1.1	1MB/6.0	*	

PRODUCT	V.	REQ.	★	\$
INSIGHT EXPERT ACCOUNTS RECEIVABLE	2.2	1MB/6.0.2	*	
INSIGHT EXPERT GENERAL LEDGER	2.2	1MB/4.2	\$99	
INSPIRATION	3.0.1	1MB/4.2	12/91	*
INSTANT-EXPERT PLUS	2.0	1MB/5.0	FREE	
INTERFACE RAVE	2.0.5	2MB/6.0.4	FREE	
INTOUCH	1.1.7	512KE/4.2	3/92	FREE
ITHINK	2.0	2MB/6.0.2	\$149	
KALEIDAGRAPH	2.1	2MB/6.0.5	9/91	\$20
KIWIENVELOPES	3.1	512KE/4.1	*	
LABVIEW	2.2	4MB/6.0.5	10/91	*
LANGUAGE SYSTEMS FORTRAN	3.0	2MB/6.0.4	\$100	
LAPLINK MAC III	3.2	512K/2.0	FREE	
LAPLINK MAC PLUS III	3.0	512K/2.0	*	
LASERPAINT COLOR II	1.02	1MB/6.0.3	FREE	
LETRASTUDIO	2.0	2MB/6.0	*	
LIGHTSPEED COLOR LAYOUT SYSTEM	2.5	1MB/6.0.5	*	
MACANALYST	3.1	2MB/6.0	*	
MACARCHITRION	5.5	2MB/6.0.3	*	
MACBRAIN	3.0	1MB/6.0.5	\$295	
MACDRAFT	2.1	1MB/6.0.2	*	
MACDRAW II	1.1	1MB/6.0	*	
MACDRAW PRO	1.5	2MB/6.0.5	11/91	*
MACENVELOPE	5.1	1MB/4.2	\$29.95	
MACENVELOPE PLUS	2.0	512KE/3.2	\$50	
MACFLOW	3.7	1MB/6.0	\$30	
MACFORTRAN II	3.1	4MB/6.0.3	\$99	
MACGLOBE	1.0	1MB/6.0.4	4/92	*
MACLABELPRO	1.5	1MB/6.0.3	\$19.95	

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PRODUCT	V.	REQ.	★	\$
MACLINKPLUS/PC	6.0	1MB/6.0.3	3/92	*
MACMONEY	3.5	512KE/4.0		\$12
MACPAINT	2.0	512KE/3.2		\$25
MACPALETTE II	2.2	1MB/6.0.5		*
MACPHONEBOOK	3.0	1MB/6.0	9/91	*
MACPLOT PROFESSIONAL	4.0	1MB/6.0.5		*
MACPLOT STANDARD	4.0	1MB/6.0.5		*
MACPROJECT II	2.51	1MB/6.0		\$99
MACRECORDER	2.03	512K/3.2		*
MACRENDERMAN	1.1	5MB/6.0.5		\$75
MACROMIND DIRECTOR	3.1	2MB/6.0.5		\$149
MACSCHEDULE	2.5	1MB/6.0		\$30
MACSCHEDULE PLUS	1.0.5	1MB/6.0		FREE
MACSPIN	3.01	512K/4.3	3/92	*
MACTERMINAL	3.0	512K/3.2		\$65
MACTOOLS DELUXE	1.2	1MB/6.0		*
MACTOPS	3.1	1MB/6.0.5		*
MACVISION	4.1	2MB/6.0.4		*
MACWRITE II	1.1v2	1MB/6.0		FREE
MANAGING YOUR MONEY	4.0	1MB/6.0.3		*
MANAPRO GENERAL LEDGER	3.1	1MB/6.0		NA
MAPLE V		2MB/6.0.7	5/92	*
MARCOPOLO	1.1	1MB/6.0		FREE
MARKET ANALYZER PLUS	2.0	2MB/6.0.2		\$99
MARKETMASTER	3.5	1MB/6.0.3		*
MARKUP	2.0	1MB/6.0		\$30
MASTERFINDER	1.1	1MB/6.0.5		*
MASTERJUGGLER	1.57	512K/6.0		\$15
MASTERPLAN	1.03	512K/6.0.5		FREE
MASTER TRACKS PRO	5.0	1MB/4.1		\$45
MATHCAD	2.06	1MB/6.0.2		FREE

PRODUCT	V.	REQ.	★	\$
MATHEMATICA	2.0	1MB/6.0		*
MATHTYPE	2.1.1	512K/6.0.2		*
MATHWRITER	2.0	2MB/6.0.5		*
MATLAB	4.0	1MB/3.0		*
MEDIATRACKS	1.01	1MB/6.0.2		FREE
MENUFONTS	4.01	1MB/6.0.5	5/92	\$20
METAPICT	2.0	512KE/4.5		\$69
MICHAEL'S DRAW	1.0	1MB/6.0.5	12/91	NA
MICROPHONE II	4.0	2MB/6.0	7/92	*
MICRO PLANNER MANAGER	1.0	2MB/6.0		*
MICROSOFT EXCEL	3.A	1MB/6.0.2	9/91	*
MICROSOFT FILE	2.0	512K/3.2		*
MICROSOFT MAIL	3.0	1MB/6.0.2		*
THE MICROSOFT OFFICE	1.5	1MB/6.0.2		\$129
MICROSOFT POWERPOINT	2.01	1MB/6.0		FREE
MICROSOFT PROJECT	1.1	1MB/6.0.4	11/91	NA
MICROSOFT WORD	5.0	512KE/3.2	4/92	\$129
MICROSOFT WORKS	2.0e	512K/6.0		*
MINDLINK	2.0	1MB/6.0		*
MINDWRITE	2.1	512KE/4.2		*
MINICAD+	3.1	1MB/6.0		*
MOCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		\$15
MODELSHOP II	1.1	1MB/6.0.2	3/92	FREE
MORE	3.1	1MB/4.1		*
MR. FILE	1.1.1	1MB/4.2		FREE
MULTI-AD CREATOR	3.0	2MB/6.0.3		*
MULTILEDGER	1.1	512K/3.2		\$75
MUSICPROSE	2.1	1MB/6.0		FREE
MUSIC PUBLISHER	2.5.2	1MB/6.0	12/91	\$15
MYADVANCEDMAILLIST	3.0	512K/4.1		*
MYDISKLABELER III	3.0.4	1MB/6.0		*

PRODUCT	V.	REQ.	★	\$
M.Y.O.B.	3.0	1MB/6.0	10/91	\$79
MYTIMEMANAGER	4.0	1MB/6.0.3		*
NETMINDER ETHERNET	2.1	2MB/6.0		\$100
NETWORK BUNDLE FOR THE MAC	3.0	512K/3.2		*
NETWORK SUPERVISOR	2.0	2.5MB/6.0.3	8/92	*
NISUS	3.06	1MB/6.0.2		*
THE NORTON UTILITIES FOR THE MACINTOSH	2.0	1MB/6.0.4		\$39
NOW UTILITIES	3.0.1	1MB/6.0.4	2/92	\$49
NUBASE PRO	1.5	1MB/4.1		FREE
OMNIPAGE	3.0	4MB/6.0		\$25
OMNIPAGE PROFESSIONAL	1.0	5MB/7.0		*
OMNIS SEVEN		2MB/6.0		*
ONCUE II	2.0	512K/6.0.2		\$34.95
ON LOCATION	2.0	1MB/6.0.5	6/92	\$25
ON SCHEDULE	2.0	1MB/3.0		*
PANORAMA	2.03	1MB/6.0	5/92	*
PAYROLL	4.0	2MB/6.0.5		\$B9
PERFORMER	3.61	2MB/6.0.2		*
PERSONAL PRESS	2.0	1MB/6.0.3		\$39.99
PHONENET LIAISON	3.0	1MB/4.2		\$75
PHOTOMAC	1.5	2MB/6.0.3		\$75
PICTURE	1.0	512K/6.0		NA
PICTUREBOOK+	1.0	1MB/6.0	2/92	*
PICTUREPRESS	2.0	2MB/6.0.4		*
PIXELPAINT	2.1	2MB/4.1		*
PIXELPAINT PROFESSIONAL	2.01	4MB/6.0.5	9/91	\$125
PLAINS & SIMPLE	1.06	1MB/3.2		*
PLANISOFT	1.3	512K/4.2		\$4B

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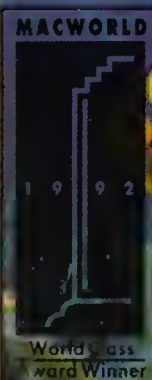
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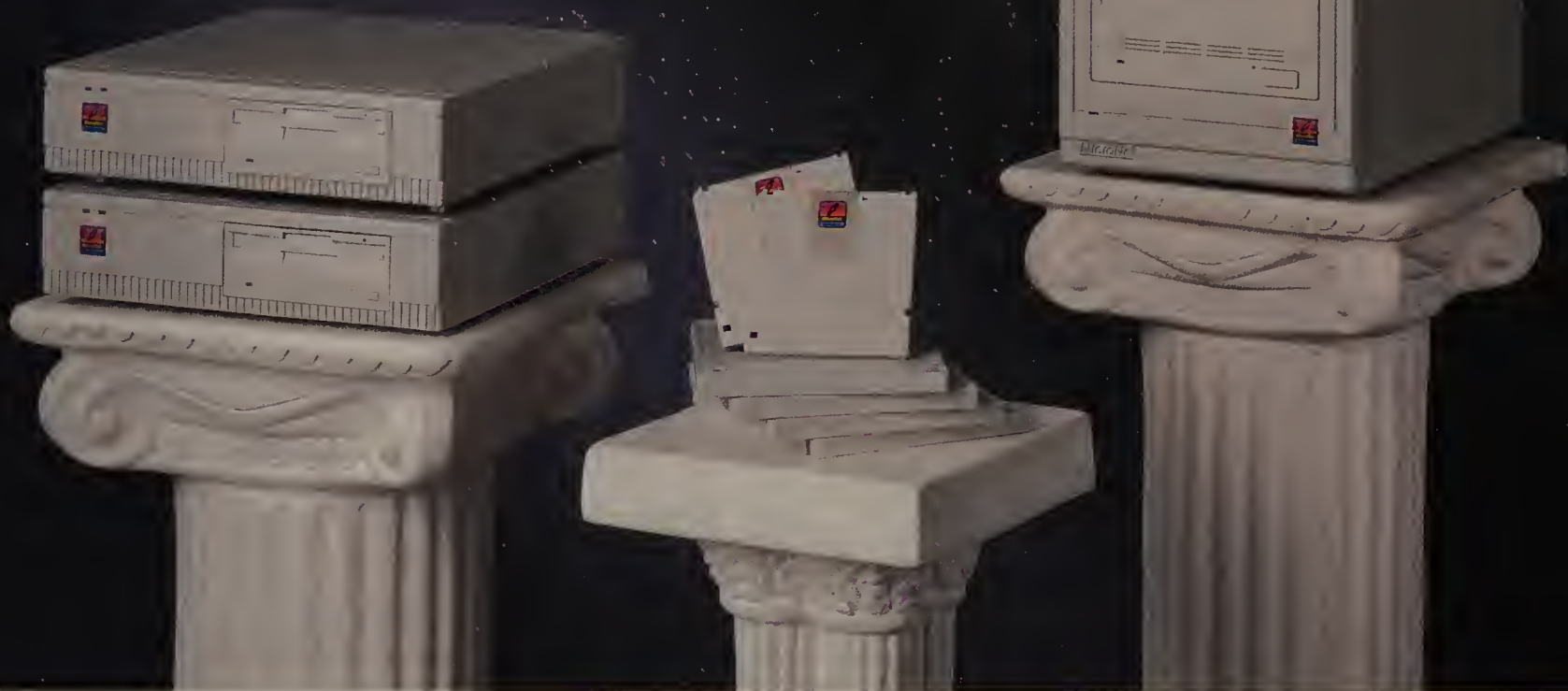
PRODUCT	V.	REQ.	*	\$
POSTERWORKS	2.1	2MB/6.0.3	*	
POWERDRAW	3.0	1MB/6.0	*	
POWERSTATION	2.5.5	512K/4.1	*	
POWERTRAX	1.1	1MB/6.0.5	FREE	
PRACTICA MUSICA	2.2	512K/3.2	*	
PRESENTER PROFESSIONAL	1.0	5MB/6.0.5	NA	
PRO-CITE	2.0	1MB/6.0.2	6/92	\$95
PRODIGY	3.1	1MB/6.0	FREE	
PROFESSIONAL COMPOSER	2.3	1MB/6.0.3	FREE	
PROGRAPH	2.5	2MB/6.0	6/92	\$49.99
PROTOTYPER	3.0	1MB/4.1		\$99
PUBLISH IT	2.0	1MB/6.0	*	
PUBLISH IT EASY	2.5	1MB/4.2		\$49.95
PYRO	4.0.1	512K/4.1		\$15
QUARKXPRESS	3.1	2MB/6.0.5	7/92	*
QUICKDEX II	2.3	1MB/6.0.5	*	
QUICKEN	3.0	1MB/6.0.5	12/91	*
QUICKKEYS ²	2.1	1MB/6.0.2	*	
QUICKLETTER	1.1.5	1MB/6.0		\$25
QUICKMAIL	2.5.1	512KE/3.2	*	
QUICKSHARE	2.0	512KE/3.2	*	
QUICKSHOT	2.1	1MB/4.2		\$5
RAGTIME 3	3.1	2MB/6.0		\$150
RAY DREAM DESIGNER	2.2	4MB/6.0.5	9/91	*
READ-IT OCR PERSONAL	3.0.A	2MB/6.0.5		\$49
READ-IT OCR PROFESSIONAL	3.0	2MB/6.0.3	*	
READYSETGO	4.5	1MB/6.0	*	
RETROSPECT REMOTE	1.3	1MB/6.0	*	
RIGHTWRITER	3.2	512K/3.0		\$9.95
RIVAL	1.1.9v	1MB/6.0	FREE	
RUNPC	3.1.2	512K/6.0.4	NA	
SAM	3.0	1MB/6.0		\$29
SCHEDULEMAKER	3.01	1MB/6.0		\$25
SCSI PROBE	3.4	2MB/6.0	10/91	FREE
SCULPT 3D	2.1	8MB/6.0.5	FREE	
SCULPT 4D	2.1	8MB/6.0.5		\$1000
SEND EXPRESS	2.1	1MB/6.0.2	*	
SENSIBLE GRAMMAR	2.1	1MB/5.0		\$30
SHADOWWRITER	2.0	2MB/6.0.3		\$20
SILVERLINING	5.31	1MB/6.0	*	
SKETCH	1.012	8MB/6.0.5	8/92	FREE
SMALL BUSINESS ACCOUNTING SYSTEM	2.1	512K/4.1	FREE	
SMART ALARMS	3.07	1MB/6.0.2		\$28
SMARTCOM II FOR THE MAC	3.3	1MB/6.0.5	*	
SMARTFORM DESIGNER	1.1	1MB/6.0	FREE	
SMARTSCRAP & THE CLIPPER	2.1	1MB/6.0.3		\$40
SNAP	3.2	1MB/3.0	2/92	*
SOUND DESIGNER II	2.2	2MB/6.0.5	*	
SPELLING COACH PROFESSIONAL	3.1	512KE/4.2	*	
SPELLSWELL	2.2	512K/3.2		\$20
SPINNAKER PLUS	2.0	2MB/6.0		\$45
STATISTICA/MAC	2.0	1MB/6.0.5	FREE	
STATUS MAC	3.0	1MB/6.0	5/92	*
STEPPING OUT II	2.02	1MB/4.1	FREE	
STICKYBUSINESS	1.4	512KE/6.0.3	*	
STRATAVISION 3D	2.0	2MB/6.0.3		\$99
STUDIO/B	2.0	2MB/6.0.5		\$30
STUDIO/32	1.2	5MB/6.0.5	FREE	
STUFFIT CLASSIC	1.6	1MB/6.0	*	
STUFFIT DELUXE	2.0	1MB/6.0	FREE	

PRODUCT	V.	REQ.	*	\$
SUITCASE II	2.0	512K/4.1		\$25
SUPER 3D	2.5	2MB/6.0.2	*	
SUPERANOVA	1.11	1MB/6.0.2	FREE	
SUPERCARD	1.5	1MB/6.0.5		\$55
SUPERGLUE II WITH GLUENOTES	2.01	512K/6.0		\$25
SUPERLASERSPOOL	3.0	2MB/6.0		\$30
SUPEROFFICE	2.02	2MB/6.0.7	FREE	
SUPERSPOOL	5.0	512K/4.1		\$30
SWIVEL 3D	2.0	1MB/6.0.5		\$75
SWIVEL 3D PRO	2.0	4MB/6.0.5		\$150
SYSTAT	5.2	2MB/6.0	*	
TASK MONITOR	4.0	1MB/6.0.3	FREE	
TASTE	1.02c	2MB/6.0.2	5/92	FREE
TEMPO II PLUS	3.0	1MB/4.2		\$39.95
TEXTPERT	3.01	1MB/6.0	FREE	
TEXTSCAN	4.0	1MB/6.0		\$75
THEORIST	1.1	1MB/6.0	*	
THINK C	5.0	2MB/6.0	7/92	\$89
THINK PASCAL	4.0	1MB/6.0	8/92	\$69
THOUGHTPATTERN	1.2.2	1MB/6.0	FREE	
THUNDERWORKS	1.3	1MB/6.0.2	*	
TILES	1.0.1	2MB/6.0.4	5/92	NA
TIMBUKTU	4.0.1	1MB/4.1	*	
TIMBUKTU/REMOTE	3.0	1MB/4.1	*	
TIMESLIPS III	2.1	1MB/6.0.2	*	
TOPDOWN	3.1	1MB/6.0.4	10/91	\$99
TOPSCAN PLUS	1.0	2MB/6.0.5	NA	
TOUCHBASE	2.0	1MB/6.0.5	8/92	*
TRAPEZE	2.1	1MB/6.0.2	FREE	
TRUEFORM	2.1	1MB/6.0	FREE	
TSCRIPT	3.0	1MB/6.0		\$60
TYPEALIGN	1.04	1MB/6.0	FREE	
TYPEREUNION	1.01	1MB/6.0	FREE	
TYPESTYLER	2.0	2MB/4.0		\$25
ULTRAPaint	1.03	1MB/6.0.2	FREE	
UNIVERSAL SOFTPC	2.5	2MB/6.0	11/91	\$99
VENTURA PUBLISHER	3.2	2MB/6.0.5		\$59
VERSACAD/MACINTOSH EDITION	4.0	2MB/6.0.5		\$295
VERSATERM	4.6	BOOK/4.2		\$20
VERSATERM PRO	3.6	BOOK/4.2		\$20
VIDEOPAINT	1.1	2MB/6.0.3		\$35
VIREX	3.8	1MB/4.2		\$15
VIRTUAL 2.0 FOR 030	2.0.4	2MB/6.0	FREE	
VIRTUAL 2.0 FOR MAC II	2.0.4	2MB/6.0	FREE	
VIRTUAL 3.0 FOR MAC PLUS	2.0.4	2MB/6.0	FREE	
VISION	1.32	2MB/6.0.3		\$29
WHITE KNIGHT II	1.12	1MB/6.0.2	*	
WILLMAKER	4.0	512K/4.2		\$29.95
WINGZ	1.1	1MB/6.0	FREE	
WORD FINDER	2.0	512K/3.2	*	
WORD FINDER PLUS	1.0	512KE/6.0		\$19.95
WORDPERFECT FOR THE MACINTOSH	2.1	1MB/6.0.3	6/92	*
WORDPERFECT OFFICE	3.01	1MB/6.0.5	12/91	NA
WORDSCAN	1.0	4MB/6.0.5	3/92	NA
WORDSCAN PLUS	1.0	4MB/6.0.5	6/92	NA
WRITENOW	3.0	512K/4.2		\$49.95

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Public Utilities has discovered a problem on the disk "HD." The Volume Bitmap is incorrect. We suggest you fix this.

Don't Fix

Fix Now

But before you get back up and running, you have to spend a lot of time waiting by the side of the road.

Which is why Public Utilities™, the ingenious new package from the creators of Suitcase™, is the utility every Macintosh® has been waiting for.

Instead of getting you back up and running, Public Utilities concentrates on *keeping* you up and running.

How?

By automatically finding and fixing potential disk and data corruption problems *before* they leave you stranded.

Every half hour (more often if you're cautious, less often if you're a daredevil) Public Utilities performs a detailed diagnostic scan of your disk.

If anything is amiss, it politely lets you know and prompts you to run the appropriate repair program.

All you have to do is point, click and carry on with whatever you were doing.

(You may also gasp, sigh, and pat yourself on the back for ordering Public Utilities as soon as you heard about it.)

It doesn't take an MIS type to appreciate what Public Utilities can mean in higher productivity and lower support costs.

But if you *are* an MIS type, you'll be delighted to know that, in addition to protecting your people

from disaster, Public Utilities reminds them to do prudent things like perform regular backups, update their passwords and optimize their hard disks.

It even launches the requisite software for them, at a stroke.

(If the requisite software doesn't happen to be a Fifth Generation product, Public Utilities will launch it anyway.)

Of course, even Public Utilities can't prevent people from deleting their files or reformatting their hard disks.

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To get you back up and running promptly, Public Utilities offers the most complete after-the-fact diagnosis and repair.



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Public Utilities automatically finds, detects and repairs a range of common disk problems before they crash your system.



Undelete File

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Repair File

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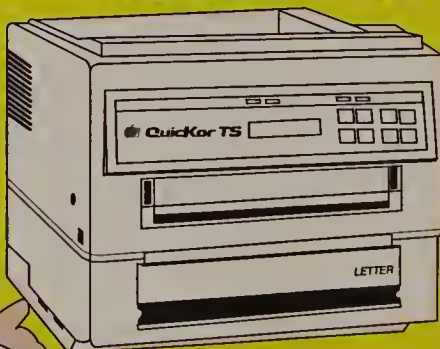
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Lab Notes

Film Recorders: Slide-Making Pitfalls

BY MARK HURLOW

AFTER MUCH TRIAL AND ERROR, WE managed to produce some nice-looking presentation slides from some of the film recorders we tested for this month's comparative feature, "Slides while You Wait." But before you rush out to buy one of the recommended film recorders and prepare to become a successful presentation slide-maker, read on for some insights on the numerous obstacles we encountered during our testing, plus a number of techniques that should help you overcome the many pitfalls of making slides on the Mac.

Speed Bumps

THE FIRST LESSON we learned from our speed tests was to avoid images with left-to-right gradients, since they take much longer to print than do top-to-bottom gradients.

That's because most film-recorder applications encode data for printing by using run-length encoding, or RLE (a technique for compressing data and speeding file transfer from the CPU to the film recorder). The RLE algorithm scans the original file line by line from left to right, counting the number of contiguous like-colored pixels and encoding these pixel strips with the number of pixels they contain and their color value. In a left-to-right gradient few pixels in any given line are the same color; the number of strips of like-colored pixels is high, and the amount of compression is small. The same is true for radial shading. An image with a top-to-bottom gradient can be compressed and decompressed easily, since there is a single pixel value for each line.

Switching to a top-to-bottom gradient can improve speed dramatically; for example, the Agfa ProColor Premier shaved the time it took to print a slide from 164 to 107 seconds.

If you must use a left-to-right gradient and you're not in a hurry, print the slide in the background (Lasergraphics' film recorders and Presentation Technologies' Montage FR2 both support background printing), or print it at a time when you don't need to use the Mac.

Similar problems often apply to processing slides of scanned images, since most of them have many pixels of different values and few sequences of identical colors. As a result, files take longer to compress, send, and decompress.

One way to cut down the print time on large scanned files is to print them in 2K resolution, which is one-quarter the data file size that is required for 4K resolution (2048 by 1300 lines per inch versus 4096 by 2732 lpi). We found very little difference in quality between files of 2K and 4K resolution. If you have a TIFF file smaller than 8MB, you can probably image it at 2K without sacrific-

ing image quality, since its horizontal resolution is probably less than 2048 lpi.

If your film recorder supports TIFF format, choose that over PICT. Agfa's PCR II imaged a TIFF file at one third the time required to image the same file in PICT. Because TIFF images contain only pixel data, the software can read the data, enlarge it to the appropriate resolutions, and send it directly to the film recorder. But film recorder software must decompress PICT files before feeding the data to the film recorder, which slows the slide making.

Another method of speeding the imaging process is to use a RISC-based hardware rasterizer (not available for some film recorders). Using a RISC Rascol rasterizer with the Lasergraphics LFR

continues



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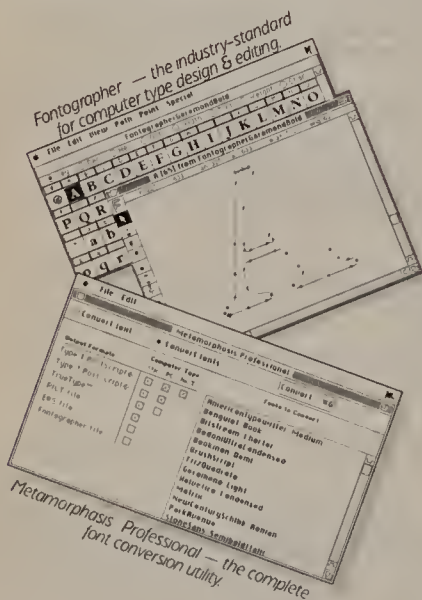
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Mark II often cut the time in half. Using a faster CPU and allocating more memory to the film-recorder application also help. Since some film recorders use a three-pass process for images that contain more than 256 colors, cutting down the number of colors in your presentation slide (such as replacing a graduated background with one that contains fewer than 256 colors) also helps speed the process.

Image Is Almost Everything

APART FROM SPEED, OUR OTHER PROBLEMS involved output quality. The first problem we noticed in our quality test was *banding*, a clustering of shades in a gradient—caused either by the software's inability to generate enough transition colors, or by flaws in the film recorder's color lookup table, such as using some colors twice and skipping others.

To minimize banding, limit the number of gradient steps by reducing the range of colors. For example, replace a background that gradates from dark to light blue with one that gradates from dark to medium blue. Avoid extreme opposites like black and white (at least half the film recorders we tested exhibited banding with this type of background). Set the maximum number of gradation steps, to generate the smoothest possible sweep. For a PostScript film recorder like General Parametrics' SlideMaker or Agfa's ChromaScript PostScript rasterizer (for Agfa film recorders), use ResEdit to modify your presentation software to support a 256-shade gradient instead of a 33-shade one. We reduced banding on the SlideMaker by modifying Aldus Persuasion.

We also encountered difficulty in predicting color output, since monitors and film recorders do not use the same color space. Colors can also vary among film recorders and among different manufacturers' film. For example, using the recommended color film, the GCC ColorFast produced a much yellower white than the Lasergraphics LFR series did. And one manufacturer's film may have a bluish cast, while another's might have a yellowish cast.

For better predictability of slide color, let the film recorder warm up for at least 10 minutes. Create your own color charts and label them for future reference. If possible, experiment with color adjustment and brightness settings.

Make sure all your film is from the same batch, or use professional film, which has stricter color precision than regular film does. To maintain professional film's optimal color balance, keep the film refrigerated, have it developed as soon as possible, and use a professional processing lab—these usually maintain

tighter control over processing chemicals.

Another problem we ran up against was *blooming*, or *fringing*—caused by overlapping pixels, which film recorder manufacturers use to avoid gaps between pixels. However, overlapping pixels of different colors invariably form a third color, producing, for example, a thin yellow line between a red and a green object. Film recorders with a smaller *spot size* (the size of the beam of light used to expose the image) exhibit less blooming, while those with a larger spot size, especially when coupled with a smaller screen (since the spot is larger in relation to the overall image size), produce more noticeable blooming. Some film recorders have blooming-reduction features (such as the GCC ColorFast's Improve Color Edges feature and the Agfa ProColor Premier's and PCR II's Repeat Function); you can also minimize blooming by selecting different color combinations; adding a thin black line between transition colors; and keeping certain colors—particularly primary colors—away from each other.

When we began mounting our slides, we discovered that slide mounts cover the slides' edges, hiding approximately 5 percent of the image. Some film recorders, such as General Parametrics' SlideMaker, exacerbate the problem by automatically enlarging slides by 5 percent. Make sure you select the right Page Setup setting, including page size and orientation. When you're creating an image, place text and graphics at least ½ inch from the edge. Preview before printing; most film recorders support on-screen previewing, and some even allow minimal image processing like cropping or magnifying before printing. The SlideMaker even provides preview color printouts.

The Final Touch

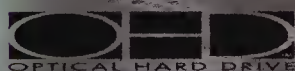
USE GLASS MOUNTS TO PREVENT FILM curvature, which causes distortion when slides are projected. Specify anti-Newton glass to avoid Newton rings (rings of color produced by moisture trapped between the film and the glass mount). Also specify non-pin-registered mounts if your camera back doesn't support pin registers (check your manual).

Use a slide projector with a high-quality projection lens. Some lenses are prone to chromatic aberration—blue and red tinting around white objects.

Finally, get a projection screen with high reflectivity, such as a glass-beaded screen (never use a wall), and make sure the room you use for your presentation is dark enough. After all, once you've invested all that time and money in producing the best possible slides, why ruin your presentation with poor projection? **m**

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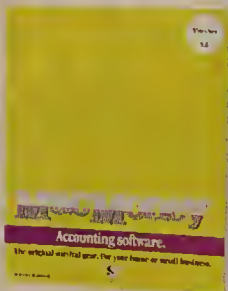
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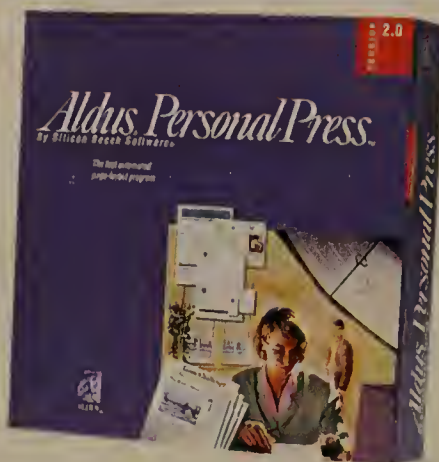
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04173	Omnipage 3.0	498	☑	✓
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04412	Wordscan + for Mac	394	✓	
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Clarix

03693	Clarix Cad	614	☑	✓
02201	MacPaint 2.0	84	☑	✓
04073	MacDraw Pro	274	☑	✓

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04082	Monet	249	☑	✓
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00803	Canvas 3.0	248	☑	✓
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Electronic Arts

03594	Studio 32	448	✓	
03827	Studio 8 2.0	188	☑	✓

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00665	Fractal Design Painter V 2.0	248	☑	
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03582	FrameMaker 3.0	594	☑	
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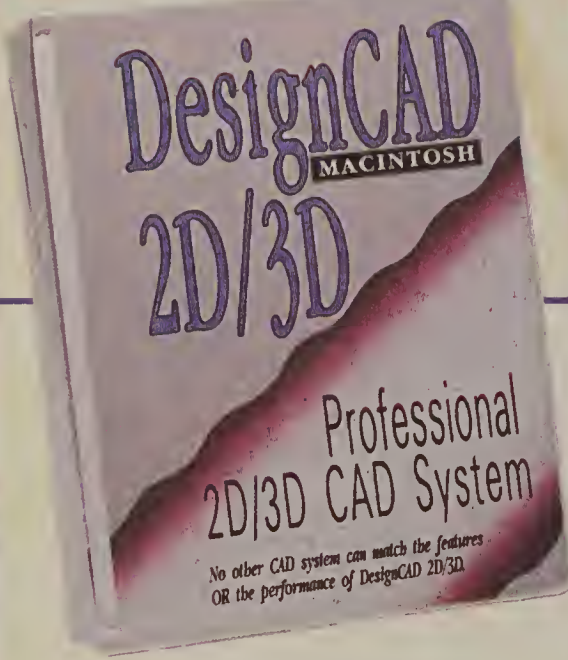
04830	Blueprint 2.1	218	☑	✓
03540	MiniCad 3.1+	594	☑	✓

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00657	ofoto	279	☑	✓
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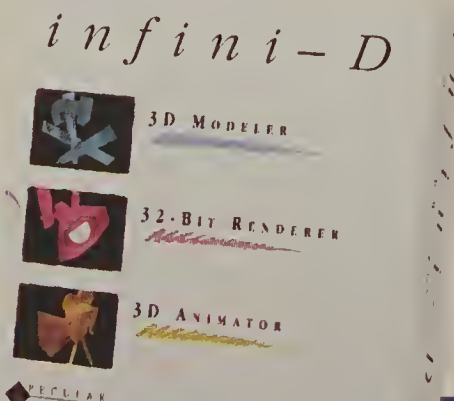
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02870	Adobe Plus Pack for Type Mgr.	108	☑	✓
03280	Adobe Type Reunion	40	☑	✓
03497	Adobe Type Manager 2.0	58	☑	✓

Casady And Greene

00315	FluentLaserFont4.0 w/TrueType	98	☑	
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Castcraft

00345	Optifont	599	☑	✓
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D-Pix Visual Velocity

04823	Folio I	349	☑	
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Online Arts

00178	Business Images Clip Art	79	☑	
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T Maker

	Click Art Series	38	☑	✓
	Click Art EPS Series	82	☑	✓

Uncle Milt's Clip Art

04273	Uncle Milt's ClipArt	34	☑	
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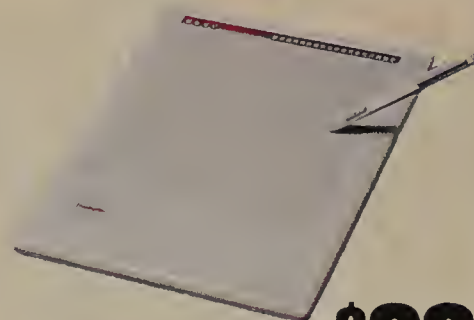
Multi Sync 4FG

\$778

Completely redesigned from the inside out, the new MultiSync FG monitors give your Mac brighter, sharper, more accurate images. The 4FG, 5FG and 6FG monitors feature the AccuColor Control System which provides unprecedented color accuracy, nothing short of dazzling. Packed with state-of-the-art extras like FullScan capabilities for 36% more screen display. NEC Technologies #07143

Mac FG 8-bit Interface Card #00578.....\$798

Mac FG 24-bit Interface Card #04985.....\$1598



DrawingPad 7.5"x7.5"

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Improve the quality and productivity of your graphics with DrawingPad™, the unique drafting tool that combines the capabilities of a digitizer, a graphics tablet and a mouse. This low-cost, versatile, high-performance tablet, complete with pressure sensitive pen, is the perfect graphics solution for graphic design, illustration, desktop publishing, drawing, tracing, drafting, mapping, and other computer graphics applications.

DrawingBoard II 12"x12" #05087.....\$438



\$1398

TrueLaser Printer

If you're in search of a laser printer that's fast, flexible and simple to use, you've just found it. For speed and versatility, nothing compares to Microtek's TrueLaser printer. This 300dpi laser printer comes with 35 built-in TrueType fonts and is fully PostScript and HP PCL4 compatible. Microtek #04047



UMAX UC630 Scanner w/ Photoshop

\$1389

Optional Slide Scanner pictured #05314.....\$737

State-of-the-art resolution and sharp, brilliant color, that's what the UMAX UC630 offers. It merges art with 600dpi high-resolution technology, so your pictures, photos and graphics can be reproduced on the screen with remarkable accuracy. The UC630 recognizes up to 16.8 million colors.

UMAX Technologies #00599

ScanMan Model 32

w/ Digital Darkroom & CatchWord Pro

\$294

ScanMan and Aldus Digital Darkroom together provide high-level functionality at a great price. Scanning has never

been this easy. In minutes, you can insert a picture (b&w or gray) into any word processing file or page layout. Some of the ScanMan Model 32's many features are: 32 gray scale and advanced halftone for superior image quality; true 400dpi scanning resolution; half-page scanning width; advanced output controls for adjustable size, resolution, and rendering of image for optimal quality on any screen or printer; tear-off tool palette for easy editing at any zoom level; works with all applications, including HyperCard. With CatchWord OCR software you'll capture text with high-level accuracy. ScanMan makes quality scanning affordable. Logitech #02561



Logitech Scan Pad #00513\$12

SCANNERS, MONITORS, PRINTERS

NEC

- 07143 Multisync 4FG 15 CLR Monitor 778 ✓
- 07144 Multisync 3FGX 15 CLR Monitor . 658 ✓
- 07182 Multisync 6FG 21 CLR Monitor .. 2898 ✓
- 07399 Multisync 5FG 17 CLR Monitor . 1398 ✓

Radius

- 04437 Direct Color/GX Interface 554 ✓
- 04488 Precision 8 Color Card 554 ✓
- 04803 Precision Color 8X 798 ✓
- 04804 Precision Color 24X 1798 ✓
- 04205 Pivot Display Monochrome 764 ✓
- 04206 Pivot Display Color 1298 ✓
- 04350 TPD 21" Monochrome 1254 ✓
- 04899 Precision Color 20" Dsply" 2968 ✓
- 04901 Powerview 539 ✓

RasterOps

- 00005 24STV 778 ✓
- 00064 24SI/SX 628 ✓
- 00708 24Mx 1244 ✓
- 00709 24MxQ 1244 ✓
- 00814 PaintBoard 24 1658 ✓
- 00816 16" Color Monitor 1238 ✓
- 00817 Video Time 1258 ✓
- 04223 19" Mono/GS Monitor 848 ✓
- 04617 8XLI Vram Expansion Kit 998 ✓
- 04115 Clearvue/GSXL Card 488 ✓
- 04118 24XLI 2048 ✓
- 04910 8XL Video Board 484 ✓
- 03482 Video Expander 484 ✓
- 00064 24SI/SX 648 ✓
- 00503 Imagepak Still Compresn Board .. 338 ✓
- 00521 24XLTV 2888 ✓
- 02627 Colorboard 264/30 24Bit 658 ✓
- 03379 Colorboard 208 24Bit Upgrade 280 ✓
- 03483 RasterOps Tv Tuner 434 ✓

- 04618 RasterOps 19" Color Trinitron 3199 ✓
- 04624 RasterOps 19" Hitachi Color 1678 ✓

SuperMac

- 00613 Video Spigot NuBus 428 ✓
- 00614 Video Spigot SI 444 ✓
- 05110 Video Spigot LC 444 ✓
- 05111 Video Spigot Pro NuBus 1458 ✓
- 05112 Video Spigot Pro Si 1364 ✓
- 05113 Spigot + Sound 820 ✓
- 05114 Spigot + Sound Pro 1728 ✓
- 05115 Spectrum 8 LC 534 ✓
- 05116 Spectrum 8 Series III 534 ✓
- 05117 Spectrum/24 Series III 1524 ✓
- 05118 Spectrum 8/24 PDQ Si 898 ✓
- 05119 Spectrum 8/24 PDQ 898 ✓
- 05120 Spectrum /24 Accelerator 454 ✓
- 05121 Spectrum/24 1094 ✓
- 05122 SuperMac Calibrator 544 ✓
- 05123 SprM.17 Multimode ClorMontr .. 1094 ✓
- 05127 SuperM. 20 Color Display 1798 ✓
- 05125 SuperM 20Dual-Mode Trntrn ... 2734 ✓

Logitech

- 00513 Scan Pad 12 ✓ ✓
- 00550 Trackman For Macintosh 84 ✓ ✓
- 00670 Scan ManModel1-w/Catchword .. 378 ✓ ✓
- 02561 ScanMn MdII 32 -DitDkRoom 294 ✓ ✓
- 05076 Wrist Pad 12 ✓ ✓

Microtek

- 00369 600Zs Color/Gray 1398 ✓
- 00370 Scanmaker 1850S 1898 ✓
- 04047 Truelaser Printer 1398 ✓
- 04064 600Gs 879 ✓

NEC

- 01031 ColorMate 40 Color Printer 3998
- 01032 M95 Printer 1544



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PowerPrint \$94

PowerPrint is a collection of Chooser-level printer drivers which will enable your Macintosh to print to over 850 printers. It produces LaserWriter-like output from your dot matrix, ink jet, or laser printer. The flexible, friendly user interface, fast printing, enhanced grayscale

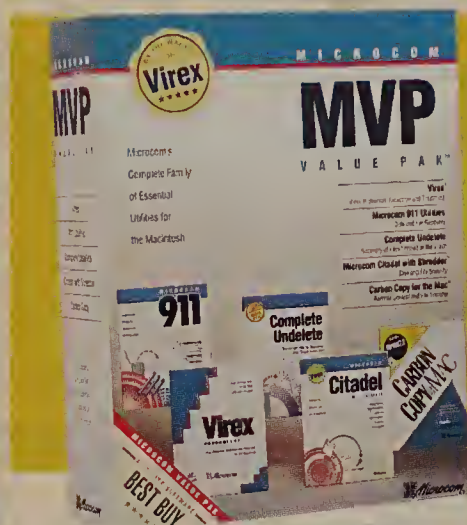
patterns, better labels and forms printing and more communications options make this a must have printer utility. Comes with everything you need, including the cable. GDT #0642 ✓✓



Kaboom! \$28

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Microcom Value Pak

\$158

Microcom Value Pak™ (MVP) is a collection of the complete Microcom family of essential utilities for the Macintosh. All the utilities a Macintosh user needs are now available in MVP at one great price. MVP includes Virex, 911 Utilities, Complete Undelete, Citadel with Shredder and Carbon Copy for the Mac. Microcom #05046 ✓✓

Virex #02077.....\$56
Carbon Copy Mac #04127.....\$68

MasterJuggler

\$25

If you want access to more fonts, DAs, FKeys and sounds than your system can hold, you need MasterJuggler. With MasterJuggler you can easily use your files containing fonts, DAs and more, even if they are being shared across most networks. System 7.0 compatible. AISoft, Inc. #04543 ✓✓



Drive 7 Universal Formatter 2.2

\$49

Drive 7 Universal Formatter is one of the most versatile and affordable formatters available. Drive7 formats and updates most third party and Apple drives, freeing you from taking chances on System 7 compatibility. Provides customized partitions, VM on Macs and Syquest, passwords, locking and more. If you have multiple hard drives, you need Drive7. The package includes Drive7Rem for Syquest, Bernoulli, Optical and CD-ROMs. Casa Blanca Works #00858 ✓✓



UTILITIES

✓ = System 7 Compatible ✓ = Money Back Guarantee

Aladdin Systems, Inc.

03458 Stuffit Deluxe59 ✓✓

AISoft

04543 Master Juggler 1.5725 ✓✓

00628 AISoft Power Utilities62 ✓✓

02853 Diskexpress II 2.049 ✓✓

Alsysis

00512 Super Disk !49 ✓✓

ASD Software Inc.

00412 Maccess & Fileguard Bundle395 ✓✓

03286 Fileguard138 ✓✓

Baseline Publishing

03762 Talking Moose23 ✓✓

03766 Init Manager33 ✓✓

Berkeley Systems Design

04046 More After Dark Bundle V.240 ✓✓

04053 More After Dark Vol. 123 ✓✓

02785 After Dark 2.0U28 ✓✓

Casa Blanca Works, Inc

04962 Drive Share89 ✓✓

00597 Blue Parrot98 ✓✓

00858 Drive 7 Universal Formatter 2.049 ✓✓

Casady And Greene

04761 Crash Barrier45 ✓✓

Compumation

00621 Print Central468 ✓✓

Custom Applications

03209 Freedom of Press 3.01254 ✓✓

03839 Freedom of Press Light 3. Mac54 ✓✓

Dantz

04722 Disk Fit Pro69 ✓✓

04194 Retrospect Remt 1.3 w/ 10 Pak ...263 ✓✓

03828 Remt 10Pack 1.3 w/o Retrospect ...146 ✓✓

02586 Retrospect 1.3146 ✓✓

Dubclick Software

03616 Clickchange 1.0455 ✓✓

Fifth Generation

04989 Superlaserspool 3.098 ✓✓

FWB, Inc

00555 Hard Disk Toolkit124 ✓✓

GDT Software Inc.

00642 PowerPrint94 ✓✓

Handoff Corporation

00855 Trashmaster 1.039 ✓✓

Icom Simulations

04542 On Cue II 2.056 ✓

Kent Marsh

00258 Folderbolt 1.073 ✓✓

Microcom

05046 Microcom Value Pak (MVP)158 ✓✓

02077 Virex 3.656 ✓✓

Now Software, Inc.

04191 Now Utilities 3.083 ✓✓

DESKTOP DIAGNOSTICS

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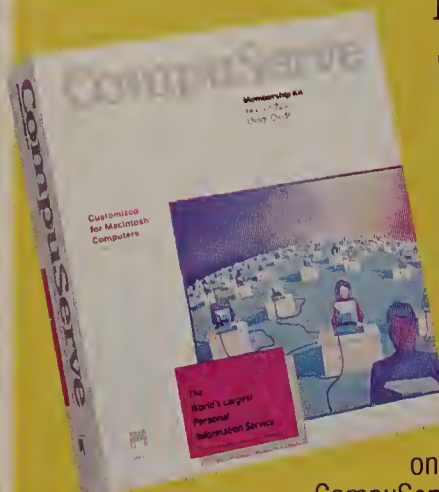
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MicroPhone II 4.0

\$209 ★★★★★^{1/2}

MicroPhone II V.4.0 delivers communications without the hassle. Ideal for international telecommunications. Praised for ease of use and advanced scripting language, MicroPhone II 4.0 now contains faster script execution, screen speed, file transfers and new interface design tools. Supports ZMODEM transfer protocol and can operate modems at any speed from 50 to 57,600 baud. It includes predesigned front-ends that put you in touch with MCI Mail, CompuServe, Dow Jones, and other info services. Software Ventures #01902 ✓

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Home Office Ultima Exterior #00877.....	\$488
Quicktel Xeba 14.4 S/R Logicode #05308.....	\$448
PSI Power Modem 24/96 PSI #04948.....	\$215

COMMUNICATIONS

Century	
04308 Century Term for Mac	124 ✓
CompuServe	
00213 Mac Membership Kit	28 ✓
00564 CompuServe Navigator 3.1	48 ✓
Freesoft Company	
02881 White Knight II	84 ✓
40770 Second Sight 2.1	85 ✓
Hayes	
04497 Smartcomm II V 3.3	83 ✓
05028 Hayes Connect Software - Mac	88 ✓
Prometheus	
02849 Prometheus MacKnowledge	84 ✓
Synergy Software	
00674 Versa Term Pro v 3.6	178 ✓
05022 Versa Term v 4.6	87 ✓
Software Ventures	
04893 Microphone II 4.0	\$209 ✓
White Pine Software	
03487 Mac 241 v 3.2	199 ✓

MODEMS

Applied Engineering	
04579 Datalink LC V.42 Fax/Modem	259 ✓
Best Data	
00698 Smart One 2400 Mac	110 ✓
Dove Computer Corp	
03514 Dove Fax Plus	264 ✓
05365 DoveFax LE	134 ✓
05364 DoveFax PB	168 ✓
Hayes	
04796 Hayes Ultra9600	698 ✓
04497 Smartcom II 3.3	83 ✓
07829 Hayes Optima 24/SC EZ	158 ✓
09936 Hayes Optima 96.32 w/Sc	388 ✓
Logicode Technology	
00852 Xeba 2400 Ext	94
04644 Xeba 9624S/R Fax/V.42Bis	188 ✓
04674 Xeba 9624S/R V.42Bis Fax	188
05232 Xeba 9696 S/R v.42 Bis	394
05308 Xeba 14,400 S/R v. 42/v.32	448
PSI Integration, Inc.	
04948 PSI Powermodem 24/96SR	215 ✓
Supra Corporation	
00065 Supra Modem 2400 Plus	120 ✓
00413 Supra Fax Modem V.32BIS	379 ✓
00414 Supra Modem V.32BIS	319 ✓
00424 Supra Fax Modem V.32 w/o	259 ✓
00426 Supra Fax Modem V.32	329 ✓
02003 Supra Modem 2400 Baud	74 ✓
03368 Supra Fax Modem Macpac	104 ✓
04351 Supra Fax Modem Plus	3178 ✓

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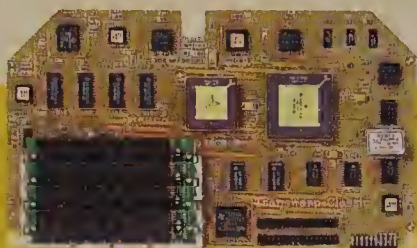
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Infinity 40 Turbo

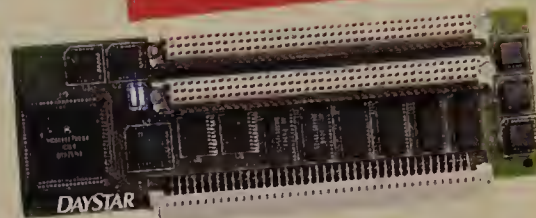
PLI's Infinity 40 Turbo provides you with all the storage flexibility you need, and the transfer speed you are looking for. With PLI's TurboCache disk accelerator software, you can achieve near zero effective average access times. One cartridge and all the necessary cables are included. PLI #02181



Transwarp Classic

\$548

Quadruple the processing speed of your standard Mac Classic! This 16MHz 68030 accelerator upgrade for the Macintosh Classic will change the way you see your machine. The TransWarp Classic is also available with optional 68882 math chip (FPU) and optional support for up to 16Mb of memory. Applied Engineering #05363



Combo Cache Ilsi w/Math Chip

\$334

Acceleration, speed and expansion, all in one chip! The ComboCache Ilsi is more than a fast card...

It's a 4-in-1 upgrade that speeds up your Mac Ilsi by up to 40%! The ComboCache Ilsi also gives you two PDS expansion slots. Plus, you get a 20MHz math chip for flying through spreadsheets and crunching numbers.

DayStar Digital #05004

#05005 ComboCache Ilsi.....\$258

ACCELERATORS

w/> = FPU Included > = also available w/ FPU

Applied Engineering

00289	Cache-In (Ilsi Cache Card)	194	✓	✓
00833	QuickSilver Ilsi Cache Card	198	✓	✓
00873	TransWarp 040	1788	✓	✓
03673	Quadralink	204	✓	✓
04072	Cache In 50 w/>	1898	✓	✓
04120	Fast Math LC	108	✓	✓
04154	Quicksilver Ilsi w/>	268	✓	✓
04325	TransWp SE Accel 25MHz w/>	798	✓	✓
04732	TransWarp LC 33MHz w/>	998	✓	✓
04735	TransWarp SE 40 MHz w/>	1478	✓	✓
04903	TransWarp LC 33MHz	798	✓	✓
04732	TransWarp LC 33MHz w/>	998	✓	✓
04904	Fastmath Classic II	139	✓	✓

DayStar Digital

00560	Equalizer LC Virtual Mem Upgr	259	✓	✓
00579	Eq. LC Virtual Mem Upgr w/>	336	✓	✓
05003	Power Math LC	118	✓	✓
00561	Fast Cache 040 f/Quadra700/900	374	✓	✓
03729	SCSI Powercard with out Simms	1124	✓	✓
03730	Ram Powercard with out Simms	499	✓	✓
04181	Fast Cache Ilsi	309	✓	✓
04182	Dual Port Ilsi w/>	169	✓	✓
04183	Dual Port Ilsi w/o >	104	✓	✓
05004	Combo Cache II si w/>	334	✓	✓
05005	Combo Cache Ilsi	258	✓	✓
00562	Fast Cache PDS /si Fpu+ Adpt	394	✓	✓
05006	Fast Cache Ilici (32k)	184	✓	✓

02877	Fast Cache Ilici 64K Ram	278	✓	✓
04323	UnivrPwrcache 33 MHz	643	✓	✓
04634	Univr Pwrcache 33MHz w/>	863	✓	✓

Powercaches must be purchased w/adpt

04319	Universal Powercache 40MHz	858	✓	✓
04320	Univr Pwrcache 40MHz w/>	1078	✓	✓
04321	Univr Pwrcache 50 MHz	1348	✓	✓
04322	Univr Pwrcache 50MHz w/>	1638	✓	✓

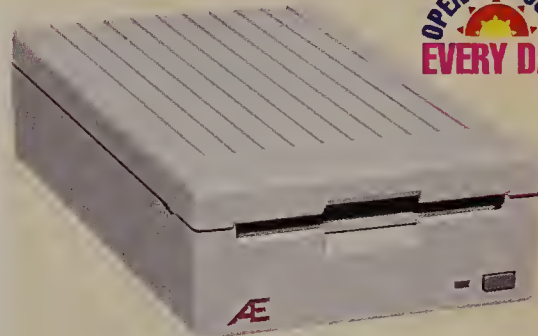
Powercache adapters

04549	Cache Adapter LC	38	✓	✓
04707	Cache Adapter Ilsi	38	✓	✓
04708	Cache Adapter PDS (SE/30)	38	✓	✓
04709	Cache Adapter II	38	✓	✓
04710	Cache Adapter Iix	38	✓	✓
04711	Cache Adapter Ilicx	38	✓	✓

NewLife Computer Corporation

04914	16MHz w/o > Plus&512E	499	✓	✓
04915	16MHz w/FPU Plus &512E	579	✓	✓
04917	SCSI for 128K,512K,512KE"	98	✓	✓
04918	16MHz w/> (SE)	479	✓	✓
04919	16MHz w/o > (SE)	399	✓	✓
04920	25MHz w/> (SE)	819	✓	✓
04922	33MHz w/> (SE)	1789	✓	✓
04923	25MHz w/> (Plus&512E)	839	✓	✓
04925	16MHz > VID Plus & 512E	719	✓	✓
04926	SE Video F/Radius FPD	289	✓	✓
04947	16MHz w/>-Classic	569	✓	✓
04952	6MHz w/o >-Classic	489	✓	✓

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AE Plus Drive 1.44/800K FD

\$298

AE Plus Drive 1.44/800K FD It's one of the finest drives available for the Mac. The Plus

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Quantum

05247	52MB Intnl HD w/univ mtg kit	358	✓	✓
00019	105MB Intnl HD w/univ mtg kit	428	✓	✓
05248	120MB Intnl HD w/univ mtg kit	474	✓	✓
00589	240MB Intnl HD w/univ mtg kit	822	✓	✓
05249	425MB Intnl HD w/univ mtg kit	1348	✓	✓
00405	52MB External HD ZFP Box	394	✓	✓
04992	105MB External HD ZFP Box	498	✓	✓
05244	120MB External HD ZFP Box	558	✓	✓
05245	240MB External HD ZFP Box	874	✓	✓
05246	425MB External HD ZFP Box	1438	✓	✓

DPI

04451	DPI 45MB Removable Syquest	548	✓	✓
04886	DPI Removable Syquest	698	✓	✓
04880	DPI 52MB Q Ext. Quantum	358	✓	✓
04881	DPI 105MB EXT Quantum	498	✓	✓
04882	DPI 240MB Q Ext. Quantum	848	✓	✓

FWB, Inc.

00555	FWB Hard Disk Toolkit	124	✓	✓
00505	FWB PocketHammer 50	524	✓	✓
00506	FWB PocketHammer 100	598	✓	✓
04891	PocketHammer 200	1198	✓	✓
04964	hammerDisk 88MB Removable	864	✓	✓
04965	hammerDisk 44MB Removable	754	✓	✓

00845	FWB PocketHammer 425	1988	✓	✓
00822	FWB hammer 300	1698	✓	✓
00823	FWB hammer 300 FMF	2074	✓	✓
00840	FWB hammer 600	2108	✓	✓
00841	FWB hammer 600 FMF	2634	✓	✓
00842	FWB hammer 1000	3028	✓	✓
00843	FWB hammer 1400	3678	✓	✓
00844	FWB hammer 1400 FMF	4738	✓	✓
00846	FWB hammerDisk 600S	3628	✓	✓

Mass Microsystems

00175	DataPak 45 Removable	599	✓	✓
00332	Datapak MO/128 3.5 Optical	1629	✓	✓
00335	Diamnd Drv 80Portbl 2 Drive	439	✓	✓
00336	Diamnd Drv 120Portbl 2Drive"	549	✓	✓
00337	Diamnd Drv 210Portbl 2Drive	949	✓	✓
00338	Dimnd Drv 320Portbl 2Drive	1499	✓	✓
00339	Diamnd Drv510Portbl 2 Drv	1949	✓	✓
00899	HitchHiker 40MB	478	✓	✓
00971	HitchHiker 80MB	679	✓	✓
04062	Mass Micro Datapak 88 Remvbl	799	✓	✓
04612	Diamond Drive 120	599	✓	✓
04613	Diamond Drive 210	998	✓	✓
04614	Diamond Drive 320	1629	✓	✓
04615	Diamond Drive 510	2148	✓	✓

PocketHammer50

\$524

PocketHammer50 costs a little more than the average 50Mb hard drive because it's in a class by itself for performance, security and reliability. The PocketHammer50 includes external SCSI termination, push-button SCSI-ID selection, external fuse and software. FWB #00505



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Whether you want hard disk compression that's completely automatic, or a hands-on utility with a variety of functions — or both — Salient has the "Doubler" for you.

AutoDoubler™, the fast, automatic, hard disk maximizer.



AutoDoubler is the effortless way to save hard disk space. You just double click to install and AutoDoubler does the rest. It compresses everything you want compressed, increasing disk space up to 100% or more.

AutoDoubler won't interrupt your work. It compresses only when your system is idle. It's compatible with other utilities. And it's so fast, you'll hardly notice it's there — just click on a file and it opens, pronto.

AutoDoubler, the solution to your hard disk space problems, is now available in a 10-pack.

.....
"The true beauty of AutoDoubler is its complete invisibility."

— Publish magazine, 2/92
.....



DiskDoubler™, the hands-on compression tool.

DiskDoubler makes it easy to copy large files to diskette, speed modem transmission, archive data, or simply free disk space.

DiskDoubler shrinks files an average of 50%, so it saves you time and money when sending via modem. It also creates self-expanding archives, so files can be opened without DiskDoubler. "Split" and "combine" functions give you extra flexibility in archiving and copying.

DiskDoubler is fast and easy — use it for all your hands-on compression needs.

.....
"Not only is it [DiskDoubler] among the top speed and efficiency performers, but it's utterly safe for your data."

— David Pogue, MacWorld, 3/92
.....

Two Doublers are better than one.

For complete flexibility, use AutoDoubler and DiskDoubler together. They're 100% compatible, 100% safe.



Free Offer!

Buy AutoDoubler or DiskDoubler between 6/15/92 and 7/31/92, send us your registration card with proof of purchase, and we'll send you CopyDoubler™ free. It's the utility that copies files in about 1/4 the time — a \$49 value!

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Circle 39 on reader service card

MACWORLD

NEWS

THIS MONTH:

FileMaker's New
Look • New Drawing
Tools • Real-Time
QuickTime • The
Return of AutoCAD
• Mac Supercomputer

BY DAN LITTMAN AND TOM MORAN

Fast 24-Bit Color under \$1000

RasterOps has brought out the PaintBoard Li, a large-screen, 24-bit color graphics adapter that offers accelerated performance for \$999.

The board supports 1024 by 768 resolution on monitors measuring

up to 20 inches diagonally. It uses a RasterOps-designed accelerator chip to achieve QuickDraw acceleration that boosts graphics performance up to 600 percent, according to the company.

The PaintBoard Li includes RasterOps' standard pan-and-zoom and extended desktop capability. The acceleration can be toggled on and off through software. The graphics board began shipping in May. RasterOps, 408/562-4200.—T.M.

Kyocera Printer Reduces Waste

Ever had a pang of ecological guilt when throwing away a toner cartridge or other printer consumable? Well, Kyocera's EcoSys aSi page printer uses new

technology that means you never have to replace the print drum or fuser, and you add toner to a toner reservoir instead of throwing out a cartridge. (You do have to dispose of the container the toner comes in, but Kyocera says it's designed to be burned, giving off only water and carbon dioxide.) The main new technology is an amorphous silicon (hence the aSi) coating on the printer drum that makes it more durable.

The EcoSys aSi uses an LED array for imaging and runs at 10ppm. Its resolution can be 300 by 300 dpi or up to 300 by 1200 dpi. The device comes with one 250-sheet paper tray and can be stacked on top of one or two optional 500-sheet trays or an optional collator. The printer has an operating cost of about $\frac{3}{4}$ cent per page, considerably less than most laser printers. It includes two slots for removable PCMCIA cards, a relatively new

standard for adding RAM, ROM, fonts, or other features. Kyocera expected to begin shipping the printer in late June at a list price of \$2395. The cost of a PostScript-emulation upgrade for the EcoSys aSi had not been set at press time. Kyocera said it will sell the printer and a Mac upgrade kit direct as well as through distribution. Kyocera, 908/560-3400.—T.M.

Motorola Boosts Modem Speed

Motorola Codex has introduced a family of modems that use new technology to boost transmission speeds to as fast as 115.2 Kbps over ordinary phone lines. An extension to the existing Codex 326X series, the new line is called the Codex *continues*

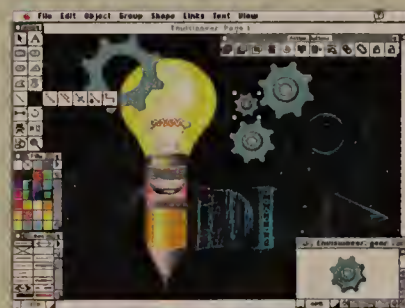
TREND

A New Way of Drawing

Aldus's Silicon Beach group has a new product in the works that may redefine drawing software.

Aldus IntelliDraw adds intelligence to objects. For example, create an object called a *symmetricon*, stretch one of its points, and all of its points stretch in the same way. Or create a *connecticon* (a group of objects that all move appropriately if one is moved) that looks like an organization chart, add a new box, and the other boxes make room for it. Numbers accessed through publish and subscribe can control the length of rectangles, providing an ad hoc bar-charting capability. And by clicking on a button, you can flip through multiple versions of an object stacked up on layers. IntelliDraw also has many conventional drawing features such as color blends, text with editable outlines, and binding objects to a path.

IntelliDraw will list for \$299. Silicon Beach Software, 619/695-6956.—D.L.

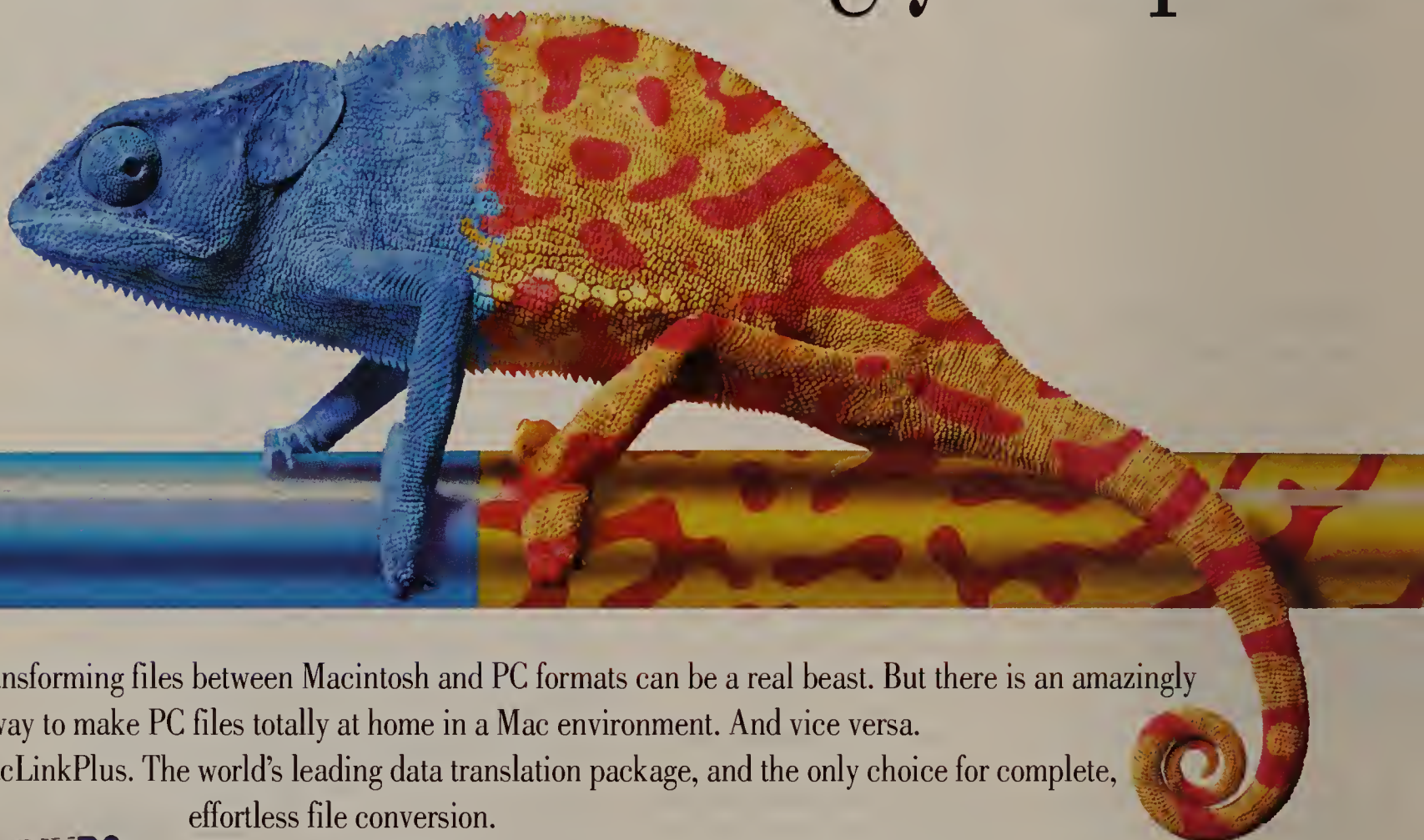


AN INTELLIDRAW DRAWING WITH SEVERAL SYMMETRIGONS. NOTE THE CONNECTICON TOOL IN THE TOOL PALETTE.



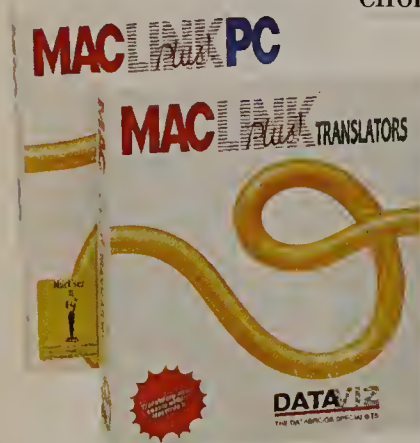
ALL THE COMPONENTS OF THE KYOCERA ECOSYS aSi ARE DESIGNED TO LAST FOR THE LIFE OF THE PRINTER.

With MacLinkPlus, Transforming Files Between Macs And PCs Is Amazingly Simple.



Transforming files between Macintosh and PC formats can be a real beast. But there is an amazingly simple way to make PC files totally at home in a Mac environment. And vice versa.

MacLinkPlus. The world's leading data translation package, and the only choice for complete, effortless file conversion.



MacLinkPlus is a vast resource of over 400 translator combinations for the most popular programs running under Macintosh, MS-DOS or Windows. Including Microsoft Word, WordPerfect, Excel, Ami Professional, MultiMate and dozens of other word processing, spreadsheet, database and graphics applications.

File translations are automatic with "point-and-click" simplicity, and we include DOS Mounter software so MS-DOS disks show up right on your Macintosh desktop. We even offer complete compatibility with XTND file conversion.

No matter what version of System you're running, MacLinkPlus sets the standard in ease of use. And our new version 6.0 is packed with features that exploit System 7 innovations.

For file translations when you're connected via a network, file server, or SuperDrive, all you need is MacLinkPlus/Translators. And for the added capability of file transfer using a cable or modem, MacLinkPlus/PC includes the same full array of translators as well as a serial cable and communications software.

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Circle 36 on reader service card

326XFast series.

The new technology actively determines the optimal frequency for data transmission on any given phone line. It is the basis of a proposed standard, given the temporary name V.fast, now under study by the CCITT standards committee. Motorola Codex says it will offer free upgrades if the final standard differs from the version incorporated in the modems.

The two modems in the series that are most likely to be of interest to Macintosh users are the 3260Fast, a small desktop dial-up modem that operates in synchronous or asynchronous modes, and the 3261Fast, which has the same features as the 3260Fast but adds the capability of working with leased lines. The 3260Fast lists for \$1395, while the 3261Fast goes for \$1695. Both products began shipping in May. Motorola Codex, 508/261-4000.—T.M.

Foolproof Gesture

Electronic composer and performer Paul DeMarinis wants his glove to send foolproof commands to his synthesizer while he's performing. "No one would notice if the machine misinterpreted a gesture for gradual change in elements like pitch or

The Return of AutoCAD

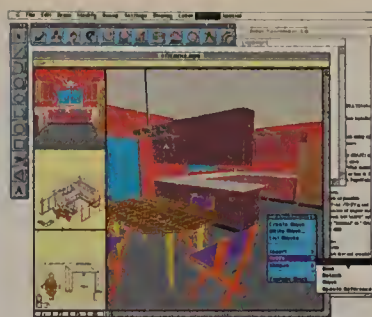
After shipping AutoCAD Release 10 in 1989, Autodesk seemed to forget the Mac. Now the company is shipping Release 11 for the Mac, amid signs that it intends to stick around.

Release 11 replaces the DOS-like interface with Mac windows, tear-off menus, and other interface standards (it also retains full keyboard support). It can work "noun-verb" (that is, select an object and then a command), like most Mac programs. Add-on programs written in AutoCAD's interpreted LISP-like language can run on the Mac.

Release 11 also adds many features, including support for sharing parts of a file on a network and a layout facility for annotating and presenting drawings.

Autodesk is also developing Mac versions of its solid-modeler add-on and its RenderMan implementation AutoShade. AutoCAD is \$3500 and is not copy-protected. Pricing and ship date on other products were not set at press time. Autodesk, 415/332-2344.—D.L.

loudness, but if I made a dramatic gesture—to stop the music, for example—and nothing happened, I'd feel like I'd been caught with my pants down." To make sure nothing of the kind occurs, he's writing software in MaxNet, a neural-network simulator that allows for marginal variation, so his gestures won't have to be inhumanly precise. MaxNet, an object for Opcode's object-oriented Max programming environment, was written by Michael Lee of UC Berkeley's Center for New Music and Au-



INTERIOR DECORATING IN AUTOCAD—WITH WINDOWS, HIERARCHICAL MENUS, AND ACCESS TO EXTERNAL LIBRARIES.



WIRES DANGLING FROM PAUL DEMARINIS'S GLOVE CARRY HAND-MOVEMENT INFORMATION TO A BANK OF MIDI DEVICES.

dio Technology. (Max lists for \$395; Maxnet is not yet commercially available.)

To make the glove, DeMarinis removed the controls from a Mattel Powerglove and interfaced it to a single-board CPU that sends MIDI commands to a Mac IIci. Since DeMarinis's compositions include both music and recorded speech, the Mac sends output to both a synthesizer and a digital signal processor. Paul DeMarinis, 415/626-4219.—ANN GARRISON

TREND

FileMaker's New Look

FileMaker Pro has been upgraded to version 2.0 and ported to Windows. The Mac and Windows versions can share data files, database structures, and even scripts; FileMaker translates incompatible fonts, image formats, and other operating system-specific details.

Other changes include host data access through Data Access Manager and support for the database suite of Apple events, which opens FileMaker to control by other applications. It offers enhanced scripting features but no real procedural language; new field types can store sounds and QuickTime movies, as well as scrolling text; FileMaker can perform wild-card searches; user can specify tab order; and a new text engine provides enhanced text features.

Pricing was not set at press time, but FileMaker Pro 2.0 will probably list for \$395. Claris, 408/727-8227.—D.L.



FILEMAKER WITH QUICKTIME: IF A PICTURE'S WORTH A THOUSAND WORDS, HOW MUCH IS A TALKING PICTURE WORTH?

Low-Cost 68040

Acceleration for the LC

Fusion Data Systems has unveiled the TokaMac ELC, a low-cost 68040 accelerator for the Macintosh LC. The TokaMac ELC achieves its list price of \$1295 by using a version of the 68040 that does not include a built-in math coprocessor or

News



VIRUS WATCH

CURRENT VIRUSES, TROJAN HORSES, AND WORMS

© INIT 1984

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92

INFO: Infects INITs; becomes active only on Friday the 13ths
IMPACT: Destroys files and changes file and folder names and attributes to random garbage

Code 252

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92

INFO: Displays a message telling user it is destroying contents of hard drive
IMPACT: After displaying message, it deletes itself without causing damage. Infected Macs may behave erratically

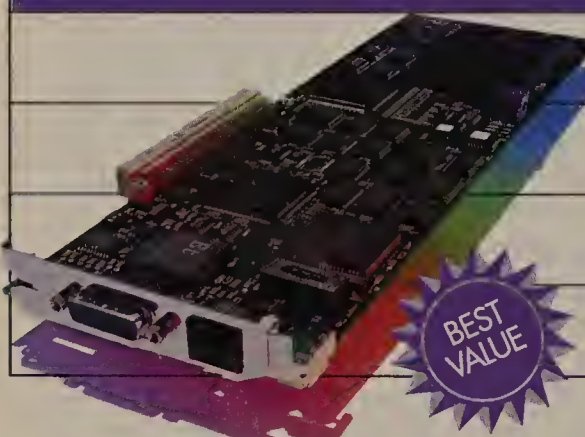
MBDF

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 6/92
INFO: Initially distributed via Trojan horse program called Tetracycle, but can spread like other viruses
IMPACT: Does not destroy data; may disable applications

memory management unit. However, the accelerator will still speed up most applications, including graphics, by 160 percent to 250 percent, according to Fusion. The TokaMac ELC requires System 7. Users can switch to the LC's native 68020 processor in software without restarting the Mac. The accelerator is shipping now. Fusion, 512/338-5326.—T.M.



BEST CARDS FOR THE APPLE 16-INCH DISPLAY!

16-Inch Display Interface Cards		E-Machines	Radius	RasterOps	SuperMac
	8-bit color	DoubleColor SX \$449	PrecisionColor 8X \$899	RosterOps 8XL \$699	Spectrum 8 \$599
	24-bit color	Futura SX \$599	PrecisionColor 24Xp \$599	Pointboard Li \$999	SuperMoc 8•24 PDQ \$999
	8-bit color with Ethernet networking built-in	ColorLink DC/T \$639	None	None	None
	24-bit color with Ethernet networking built-in	ColorLink SX/T \$789	None	None	None

Only E-Machines, the 16-inch company, brings you a complete family of color cards for the Apple 16-inch. And the only cards with Ethernet networking built-in. All feature acceleration, video-out, pan and zoom, multiple display support, and of course, the best prices in the industry! Call now for the dealer nearest you.



For your nearest dealer, call or write.
9305 SW Gemini Drive, Beaverton, OR 97005
Fax: 503-641-0946

1-800-344-7274

Circle 303 on reader service card

French Models

After years of searching, French developer Abvent has arranged for U.S. distribution of its 3-D solid modeler Zoom, just in time for version 3.

Unlike most 3-D solid modelers, Zoom supports Boolean operations such as cutting holes through walls or converting the intersection of two objects into a separate object. (Other Boolean-capable modelers include autodesys's form Z, and Turbo 3-D, another French product, which is not available here.)

Zoom's rendering capabilities include shadow-casting, Phong and Gouraud shading, and tight RenderMan integration. Version 3 does RenderMan



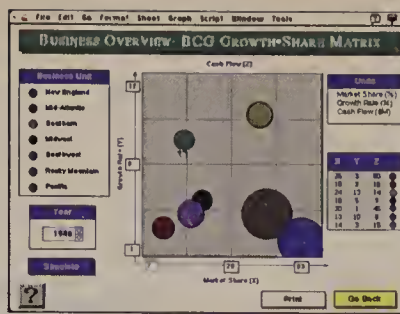
AN AUTOMOBILE MODELED IN ZOOM AND RENDERED WITH A COMBINATION OF SHADERS AND TEXTURE MAPS.

The Instant Executive

A group of in-house Wingz developers at Du Pont went their own way and founded MicroStrategy, a consulting firm that designs custom executive information systems (EISs). Now MicroStrategy is marketing EIS Toolkit version 1.1, a Wingz-based shell to help nonprogrammers create custom EISs.

EIS Toolkit provides functioning objects, such as lists and buttons, that can be incorporated into an interface template and assigned tasks by pointing and clicking. For example, a button can be defined to log on to a host database and run a SQL query (EIS Toolkit works with Informix's DataLink and similar products). Once the data is in the EIS, other buttons can *drill down* to reveal more detail or create a graph.

EIS Toolkit Designer is \$995 including Wingz and \$895 without; a ten-pack run-time version is \$3995 with the Wingz run-time or \$2995 without. MicroStrategy, 302/427-8800.—D.L.



AN EXECUTIVE INFORMATION SYSTEM, CREATED IN EIS TOOLKIT, THAT PROVIDES INSTANT ACCESS TO MANY VIEWS OF A DATABASE.

rendering internally, avoiding the need to export RIB files. It also gives a great deal of control over texture maps. Fly-throughs can be recorded as QuickTime movies. Zoom doesn't support entering and extruding text. Abvent is develop-

ing a slide-show utility for displaying multiple images that lets a user control where images appear on screen and in what order. Zoom is available for \$2495 from Rebus Technology at 617/354-3896 or ASYM Technologies at 510/943-6157; autodesys is at 614/488-9777.—D.L.



AN ARCHITRION MODEL OF A PROJECT TO REDEVELOP THE WATERFRONT IN VANCOUVER, BRITISH COLUMBIA.

Architron's New Line

Gimeor went out of business, and its architectural modeling package, Architron II, was adopted by Unic, a French CAD services company. Unic has limited Architron to distribution by a few VARs and is introducing several Architron products.

Architron II has three modules: ArchiDesign for roughing out ideas; ArchiDraw, a 2-D environment for detail work like hatching and creating blueprints; and ArchiList, for generating a bill of materials, checking square footage, and so on. This summer Unic is releasing the pared-down Architron I; Tech 2-D, a stand-alone

NEWS

TREND

Supercomputer as Toaster

Wavetracer is touting its Zephyr line of massively parallel supercomputers as a cozy Mac add-on. The top-of-the-line Zephyr 8 packs 8192 processors in a Quadra 950-size box for \$150,000. Wavetracer claims Zephyr, which requires no special cooling or power and can be attached to a network or SCSI bus, is about half as fast as a \$10 million Cray XMP.

Zephyr is not a stand-alone computer but, in effect, an accelerator board, slave to a desktop computer. (For techies: Zephyr is a single-instruction multiple-data system, with a 3-D processor mesh.)

For application developers, Wavetracer provides MultiC, a multiprocessor version of C. So far, Wavetracer's MultiC is for Unix, but a Mac OS version is coming. At least two companies are working on Mac Zephyr software: Global Communications is developing rendering software for Stratavision and RIB files; and Gene Codes is developing molecular biology applications. Wavetracer, 508/635-9000; Global Communications, 303/674-9784; Gene Codes, 313/769-7249.—D.L.

DESKTOP LIBRARIAN

General Books on the Mac

This month we page through four general-purpose Mac books.

- *Danny Goodman's Macintosh Handbook: Featuring System 7*, with Richard Saul Wurman (1992, \$29.95). This super-organized book is color-coded by section and by level of expertise. The introductory section deals with ergonomics, and the basics of starting up a Mac for the first time. Other sections cover hardware, software, and troubleshooting. The book has excellent illustrations. Terms and references in the text are highlighted. Bantam Computer Books, 212/492-9666.

- *The Apple Macintosh Book, Fourth Edition*, by Cary Lu (1992, \$24.95). This 514-page tome is extremely thorough, beginning with an almost philosophical discussion of whether you need a computer at all and whether the Mac is right for you.

Its 24 chapters explain in detail how the Mac works, the various hardware components, system software, common applications, communications, LANs, multimedia, and future directions for personal computers. Microsoft Press, 800/677-7377.

- *Dvorak's Inside Track to the Mac*, by John C. Dvorak, Mimi Smith-Dvorak, Bernard J. David, and John A. Murphy (1992, \$39.95). Billed as a comprehensive guide, this over-700-page behemoth is intended for all skill levels. Includes a disk with shareware including business applications, games, and SoundMaster. Osborne McGraw-Hill, 800/227-0900.

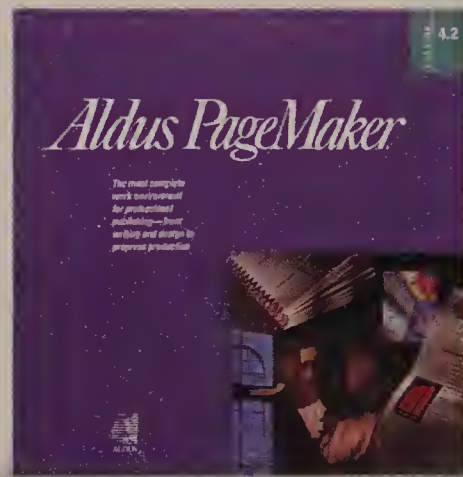
- *The Mac Made Easy*, by Martin S. Matthews (1992, \$19.95). This book for beginning and intermediate users starts with basics. Later chapters cover menus; files, folders, and disks; System 7 and the Finder; control panels; printing; applications; and communications. An appendix covers installing and using System 7. Osborne McGraw-Hill, 800/227-0900.



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T H E A R T O F P O W E R F U L I D E A S™



Coming of age...



The floppy turns 21

The floppy has finally grown up with the arrival of the Floptical disk drive. Floptical drives provide a combination of the best qualities of both magnetic and optical technology.

Each Floptical disk holds 21MB of text (or graphics, or spreadsheets, or anything). And because the Floptical disk drive reads and writes ordinary 720K and 1.44MB floppy disks, you can renew your system instead of redoing it.

Though the outside looks like an ordinary 3.5" floppy, the inside is a highly refined super floppy. Unique stamped optical servo tracks give the Floptical drive very accurate positioning of the read/write head, allowing track densities of 1245 tracks per inch, almost ten times the track densities of ordinary floppies. Even better, these embossed servo tracks can't be erased or damaged, making Floptical disks safer than any other servo-based media.

But the Floptical drive is more than just a better floppy; it's a whole new standard. The media are from Hitachi Maxell and 3M, two world-class companies providing a world-class product. Their commitment to excellence is your assurance that Floptical disks are safe enough for your most valuable data.

Floptical's high density storage and low cost, ultra-high reliability and convenience are features you'll never outgrow.



PLI Floptical storage products are also available for the PC, Atari & NeXT platforms.

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of being 21.*



MWLD AD-06

Circle 236 on reader service card

Wingz Flies Again

After Informix sold off the code that became Claris Resolve, we thought Wingz was a dead-end product. But Informix has proven us wrong.

Wingz 2.0 will offer speed enhancements, System 7 compatibility, and some System 7 features such as publish and subscribe; and Wingz's HyperScript programming language is getting a major overhaul. Wingz 2.0 will have HyperScript functions appropriate for a spreadsheet, while the full HyperScript product will be marketed to developers, probably as Informix-HyperScript (see "The Instant Executive" elsewhere in *News*). Informix-HyperScript will have strong database features such as embedded SQL and will contain the spreadsheet as one of its functions.

Informix-HyperScript programs will run on Macintosh, Windows, and Unix systems with no modification; a runtime version for use with Wingz templates will also be available. Pricing was not set at press time. Informix, 913/599-7100.—CHARLES SEITER

Anti-Gravity Mac

The Atlantis space shuttle mission scheduled for July will carry a Mac LC with a National Instruments board to study minute changes in gravitational attraction that occur when a satellite on a tether several kilometers long is released from the shuttle. The tethered-satellite release is the first test of an idea that may eliminate a great ob-



CHUCK ROGERS

JAN BIJVOET (LEFT) AND JOHN BLAKELY MAKE FINAL ADJUSTMENTS BEFORE SEALING UP A SPACE SHUTTLE EXPERIMENT.

Oxford Goes Online

Oxford University Press is demonstrating a Windows version of *The Oxford English Dictionary* (second edition) on CD ROM, which it plans to produce for the Mac by late 1992 or early 1993.

The CD ROM version of the OED is not just a way to look up the definitions of words. Each definition is broken up into fields as with a database, so its software can perform such tasks as searching for the etymology of all words beginning with quo, or finding all words derived from a common Sanskrit root, or gathering all the French-derived words whose definitions contain literary quotations from the eighteenth century. It also has a sophisticated query language for very complex tasks. It will list for \$895. Oxford University Press, 212/679-7300.—D.L.

stacle to putting up a permanent inhabited space station: lifting supplies into outer space without rockets. Eventually, payloads may be attached to an enormous spinning tether as it sweeps past the earth, and then unloaded as the tether sweeps by the space station.

The gravity-measurement experiment is being conducted by Jan Bijvoet, John Blakely, Jeff Randorf, and Dennis Wingo of the University of Alabama at Huntsville's Consortium for Materials Development in Space.—D.L.

Thinking Snow

It may not be the universal solvent, but for database users it might as well be: the Snow Report Writer (SRW) reads data in about 200 formats (database-savvy users can add new formats) and provides tools for incorporating the data into reports.

Great Plains, Softsync, and other Macintosh accounting vendors use the SRW technology; Snow Software is now marketing the engine, with an accessible interface, to end-users as version 4. In addition to tools for designing how a report will look, SRW can sort and select data and perform calculations.

Snow is developing a new version that can combine data from multiple databases in one report and supports SQL; Apple events; and O.C.E., Apple's future E-mail backbone. Version 4 is \$795 from Snow Software, 813/784-8899.—D.L.

Speedy Erasable Optical Drives

Rodime Systems has introduced the Condor 650e and the Condor 130e, high-speed erasable optical drives for the Mac that offer 652MB and 128MB of formatted capacity, respectively. The 5¼-inch Condor 650e has an average access time of 37ms and a sustained data-transfer rate of 1MB per second. The 3½-inch Condor

News

130e has an average access time of 43ms and a sustained data-transfer rate of 640K per second. Both drives are external units that work with either the SCSI I or SCSI II interface.

The Condor 650e has a suggested list price of \$4679, with cartridges listing for \$269; the Condor 130e's suggested list price is \$2498, with cartridges going for \$99. Both drives began shipping in April. Rodime Systems, 407/391-7333.—T.M.



BETA WAIT

Long-awaited products

ACIUS's 4D Server

Shown publicly January 1991. Current ship date projected: end of summer 1992.

FoxPro/Mac

Discussed publicly winter 1990/91; not in beta as of May 1992; Fox says will ship in 1992.

Interleaf 5

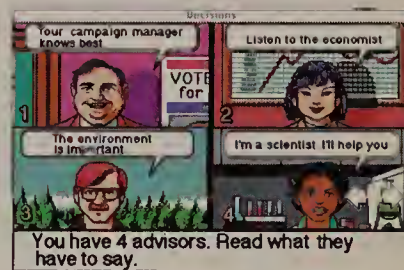
Discussed publicly October 1990. No ship date projected.

AEC's FilePower

Announced August 1991; planned to ship winter 1991/92. Ship date not set; may be ready to show August 1992.

CA/Cricket Graph 2.0

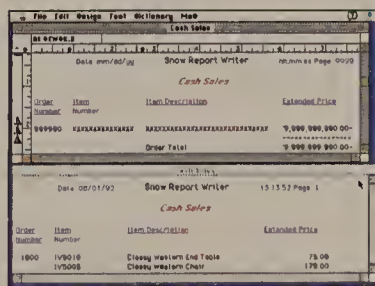
Announced in January 1992; current ship date projected: August 1992.



AS THE MAYOR IN DECISIONS, YOUR FIRST CHALLENGE WILL BE DECIDING WHOSE ADVICE TO LISTEN TO.

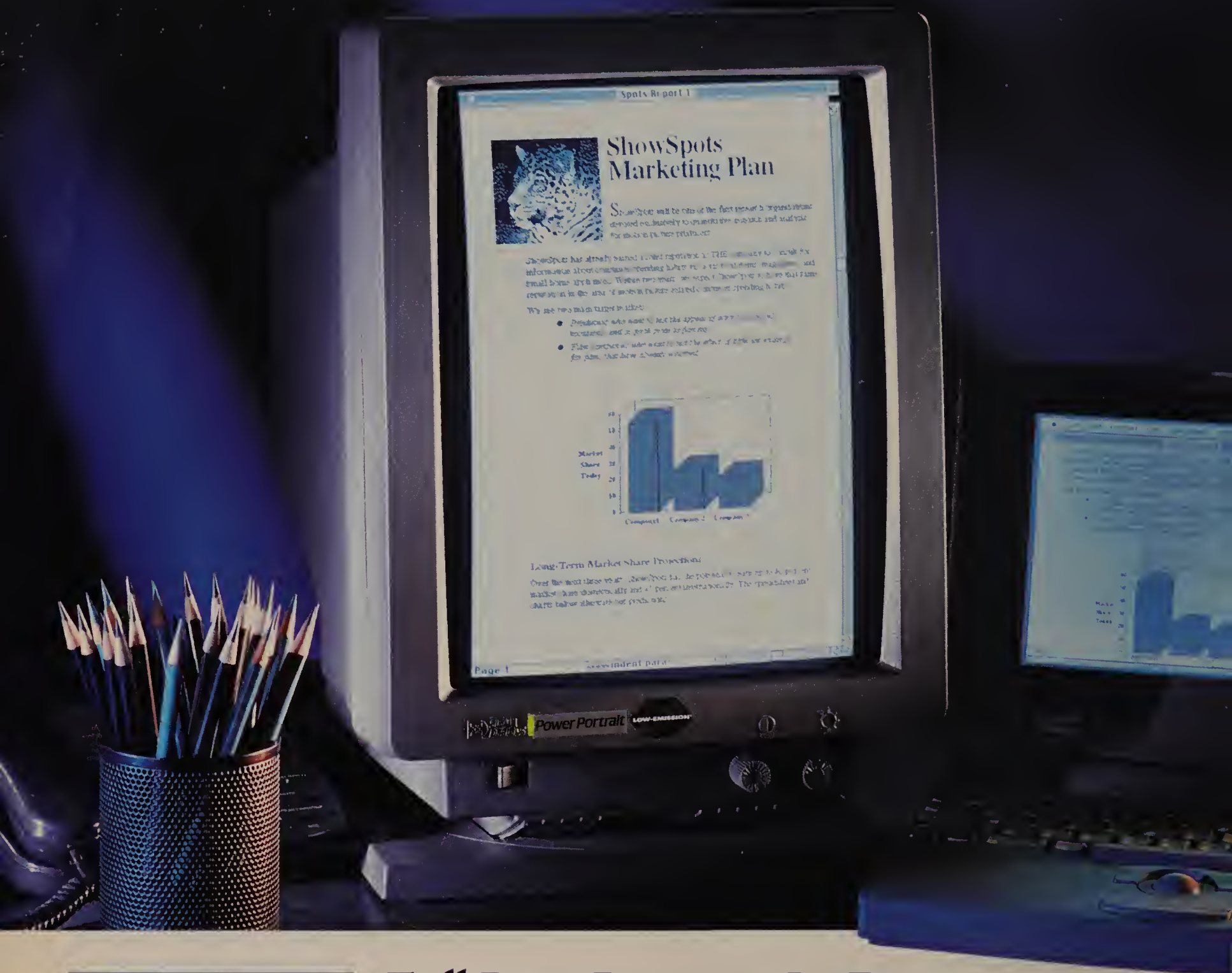
Important Decisions

Imagine you're the mayor of Alpine. You've got dead fish floating in the local swimming hole and angry environmentalists pointing the finger at Malaco, the malabar mining company that employs half the town. As if that weren't bad enough, you're up for reelection this year. Students using *Decisions, Decisions*, an environmental-policy-making simulation, play the role of the mayor under fire. With the help of an independent scientist, a campaign manager, an economist, and a leader of the local environmental council, students decide how to react. The package can be used by groups or an entire class. It costs \$119.95 and includes a guide for students and one for teachers. *Decisions, Decisions* was written by Tom Snyder Productions and is marketed by Chariot Software, 619/298-0202.—ANN GARRISON



SNOW REPORT WRITER: TOP WINDOW SHOWS A REPORT DESIGN, BOTTOM WINDOW SHOWS THE REPORT FILLED WITH DATA.

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TURKEY SHOOT

DESIGN FLAWS NOTED

Claris Resolve Inserting some cells in a worksheet? Good thing you wanted to push everything over to the right—because Resolve doesn't give you the option of moving it all down.

Correct Grammar WordStar claims this grammar checker works with QuarkXPress and PageMaker, but that really means you copy text to the Clipboard, grammar-check it, and paste it back in—minus all formatting.

Adobe Photoshop Yes, Photoshop's duotone (and tritone and quadtone) feature eliminates guesswork and can save lots of money. Too bad it doesn't support editing colors on a portion of a duotone file.

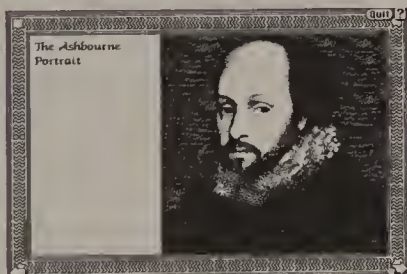
Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.



DREW HUFFMAN

ZEPPU IS A 3-D MODELER THAT FEELS LIKE A DRAWING TOOL. THIS MODEL WAS RENDERED IN MACROMIND THREE-D.

lacks animation and high-end rendering, but MacroMind Three-D, which has both but no modeler, is being upgraded to directly read Zeppo files. Zeppo can import and export Swivel files. Pricing, final name, and ship date were not set at press time. Macromedia, 415/442-0200.—D.L.



ONE OF SEVERAL PORTRAITS OF THE MASTER THAT APPEAR ON SHAKESPEARE AND THE GLOBE THEATRE.

The Bard on Disk

To click or not to click... You can decide as you make your way through Shakespeare and the Globe Theatre. One section is devoted to Shakespeare, the man; another to the social hierarchy, religious beliefs, and living conditions of his time. Other sections describe Shakespeare's colleagues at the Globe, illustrate the theater's interior and exterior, and detail the setting and source of Shakespeare's plays. Shakespeare and the Globe Theatre includes the text of *A Midsummer Night's Dream* and has a teacher's guide. It costs \$129 from Shakespeare on Disk, 914/266-5705.—ANN GARRISON

TREND

Adapter Does Color and Ethernet

E-Machines has introduced the ColorLink DC/T, an 8-bit color graphics adapter that has Ethernet Phase II on the same board. Designed for users who have filled their Mac's NuBus slots, or who own a IIx, the board uses only one slot to provide both functions. It is compatible with Novell Netware for the Mac. The DC/T supports monitors as large as 19 inches. It is available now at a list price of \$695.

E-Machines has also introduced the DoubleColor LX, a two-page display adapter for 21-inch monitors. The 8-bit DoubleColor LX, also available, lists for \$895. E-Machines, 503/646-6699.—T.M.

Fishing for Ideas

Who brainstorms with Idea Fisher? Writers, advertisers, TV producers—and Bill Rutledge of the Texas Parks and Wildlife Department. To plan a show promoting hunting in Texas, Rutledge chose the Idea Fisher menu item for generating product ideas and then answered the program's questions about his purpose, intended audience, and essential ideas. The result? On October 2 and 3 in Austin, the department will sponsor a celebrity banquet, a celebrity shotgun match, turkey-calling contests, and hunter education about safety and what not to shoot—eagles, falcons, and other protected species. Idea Fisher 2.0 is \$595 from Fisher Idea Systems, 714/474-8111.—ANN GARRISON



PETER HOEY

News

Real-Time Video for QuickTime

RasterOps has introduced the QuickPak, an expansion board that provides full-screen, QuickTime-compatible video at the maximum video rate of 30 frames per second. The QuickPak fits into the expansion connector on the company's 24STV video board and on later video boards from RasterOps.

Users drop a QuickTime driver into QuickTime's Component Manager folder, and the board operates transparently to increase the maximum size of the video window and its frame rate. Users must rerecord each QuickTime movie once. The QuickPak uses a compression/decompression chipset from LSI Logic. Expected to ship in June, the QuickPak will have a suggested list price of \$999. RasterOps, 408/562-4200.—T.M.



THE PROXIMA OVATION LCD PROJECTION PANEL DOES 227,000 COLORS.

Projection Panel Adds Digital Video

Proxima Corporation has added digital video capability to its Proxima Ovation LCD projection panel and increased the device's colors from about 24,000 to about 227,000. The new controller in the panel supports the NTSC, PAL, and SECAM and offers better color locking, definition, and fidelity.

The new version of the Ovation is shipping, at \$8495. Proxima, 619/457-5500.—T.M.

Macromedia's Splines

Macromedia (formerly MacroMind Paracomp) is developing a spline-based 3-D modeler, code-named Zeppo, that challenges the impressive Alias Sketch. Zeppo objects' lines can be modified with Bézier-curve handles as in Adobe Illustrator (which Zeppo imitates), but Zeppo's handles appear in the x, y, and z dimensions, permitting almost any kind of deformation. Zeppo has CAD-like snapping tools; lets the user define working planes anywhere in space; and supports PostScript Type 1 and TrueType fonts, though text must be modified one letter at a time. Zeppo doesn't do Boolean operations—solid objects cannot be cut or merged. It has the same alignment tools, linking capabilities, and surface materials as Swivel 3D Professional and can interpolate a skin across a series of differently shaped ribs. Zeppo

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—Joseph Schorr, Macworld, April '92

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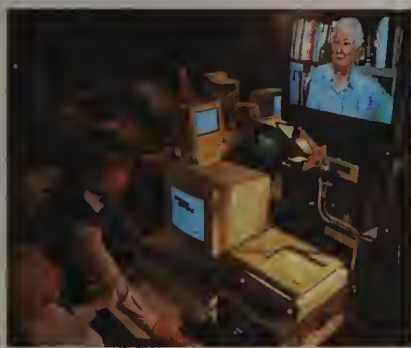
Note: We're adding two exciting new capabilities, concurrent voice communication and caller identification. These features are not yet available from any modem manufacturer, but as soon as the technology permits (estimated to be third quarter of '92), we will offer it in an easy upgrade to our Xeba line. Caller identification may not be allowed in all states.

Circle 93 on reader service card

Family Scrapbook

Immigrants to America were often too busy surviving to record family histories, but many seniors now have more leisure time than their ancestors had. Senior Net—an organization of computer-using seniors with an online network and learning centers across the country—has designed a videodisk prototype, **The Electronic Scrapbook**, for teaching and inspiring seniors to record their personal histories electronically. The disk explains how they can scan pictures of themselves and their mementos into HyperCard, then use MacRecorder to record stories that go with them. The **Electronic Scrapbook** was produced by Bay Area Video Coalition's Interact Project working with Senior Net in San Francisco. Senior Net is at 415/750-5030.

—ANN GARRISON



ROBERT HOLMGREN

SENIOR NET'S MARCIE SCHWARTZ SHOWS SENIORS HOW TO ENTER THEIR LIFE STORIES IN THE ELECTRONIC SCRAPBOOK.

TREND

Procom Joins Floptical Race

Procom Technology has introduced the Procom Floptika 20/M, a combination optical and magnetic disk drive that uses Insite's floptical drive mechanism. The Floptika 20/M stores 20.8MB of formatted data on a removable cartridge that's the same basic size and shape as a floppy disk, but the Floptika can also read from and write to a 1.44MB floppy for the Mac.

The drive uses the SCSI interface, so it works with all Macs from the Plus on up. It comes with a driver and with an installer for formatting, verifying, and partitioning the disks.

Several other companies have also announced drives using the Insite mechanism.

Now shipping, the Floptika 20/M lists for \$625. An internal version for the Quadra 900 should be available in June at a list price of \$525. Procom, 714/549-9449.—T.M.



TOM GIBSON

THE PROCOM FLOPTIKA 20/M COMBINES OPTICAL AND MAGNETIC RECORDING TECHNOLOGY.

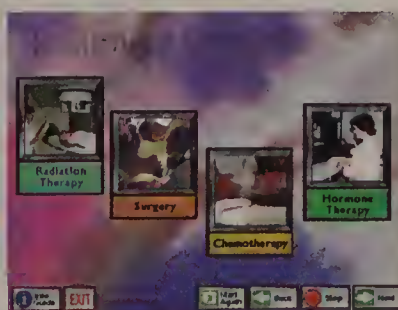
030 Accelerator for LCs

DayStar Digital has introduced the PowerCache Adapter LC, an adapter that allows its 68030-based PowerCache accelerator to work with the Mac LC and LC II. The slowest version of the accelerator essentially doubles the speed of the LC or LC II, according to DayStar. The PowerCache Adapter LC lists for \$949 for the 33MHz version, \$1249 for the 40MHz version, and \$1949 for the 50MHz version. Math coprocessors add \$300 to the

list price, except for the coprocessor for the 50MHz version, which adds \$400. All are shipping now. DayStar Digital, 404/967-2077.—T.M.

Cancer Education Project

The AMC Cancer Research Center of Denver has joined forces with Warner New Media to create **Cancer Information Guide** kiosks using Macs with touch screens and CD ROM drives. The kiosks will inform users about cancer prevention, early detection, treatment, rehabilitation, and resources. Users will be able to choose English or Spanish; the kiosks combine pictures, sound, and text, for people of all literacy levels. AMC's goal is to put 500 kiosks around the country, in health clinics, government buildings, and shopping malls. AMC Cancer Research, 303/239-3343.—ANN GARRISON



A SCREEN FROM THE CANCER INFORMATION GUIDE PROVIDING INFORMATION ABOUT DIFFERENT CANCER TREATMENTS.

News



On the Grid

Fifth Generation's new Public Utilities file- and disk-recovery package includes an INIT that runs in the background to look for potential problems. It can be configured to repair problems immediately or to stop and inform the user. Public Utilities can undelete files, and its disk defragmenter moves deleted files to safe sectors of the disk, where they may still be recoverable after a disk is defragmented. Public Utilities lists for \$149.

Public Utilities also includes Launch Pad, a bare-bones application-launcher utility to which Fifth Generation plans to add intelligence. For example, when Public Utilities is launched, it might pass a message to the user that it is time to defragment the Mac's hard drive. Fifth Generation Systems, 504/291-7221.—D.L.

External Color for PowerBooks

Computer Care has introduced BookView Imperial, an internal add-in board for the PowerBook 140 and 170 that supports 8-bit color on external monitors with screens as large as 21 inches. BookView supports virtual memory, color palette changes, the Apple Color Picker, and presentation mode. BookView Imperial displays resolutions up to 1152 by 870 on an Apple 21-inch monitor. The board also has a power-down mode for conserving battery power.

BookView Imperial was expected to begin shipping in early June, listing for \$1189. It requires dealer installation, but no modification of the PowerBook is necessary. Computer Care, 612/371-0061.—T.M.



BUG REPORT

Aldus FreeHand 3.1 Graduated fills print with severe banding on high-end devices such as imagesetters and slide recorders. Aldus will explain to users who call how to modify the User Prep file to eliminate the problem.

Aldus Persuasion 2.1 Does not display colors correctly on 4-bit (16-color) systems. Problem fixed in version 2.12, which Aldus says was sent to all registered users at no charge.

Timbuktu 4.0 Does not work correctly with Quadoras or with AppleTalk Remote Access. Version 4.03 fixes Quadra problems and most Remote Access problems; available at no charge to registered users who request it from Farallon.

GreatWorks 2.0 Y value axis sometimes displays nonsense numbers when data points are close to zero. Symantec recently shipped version 2.01 but it does not fix this bug.

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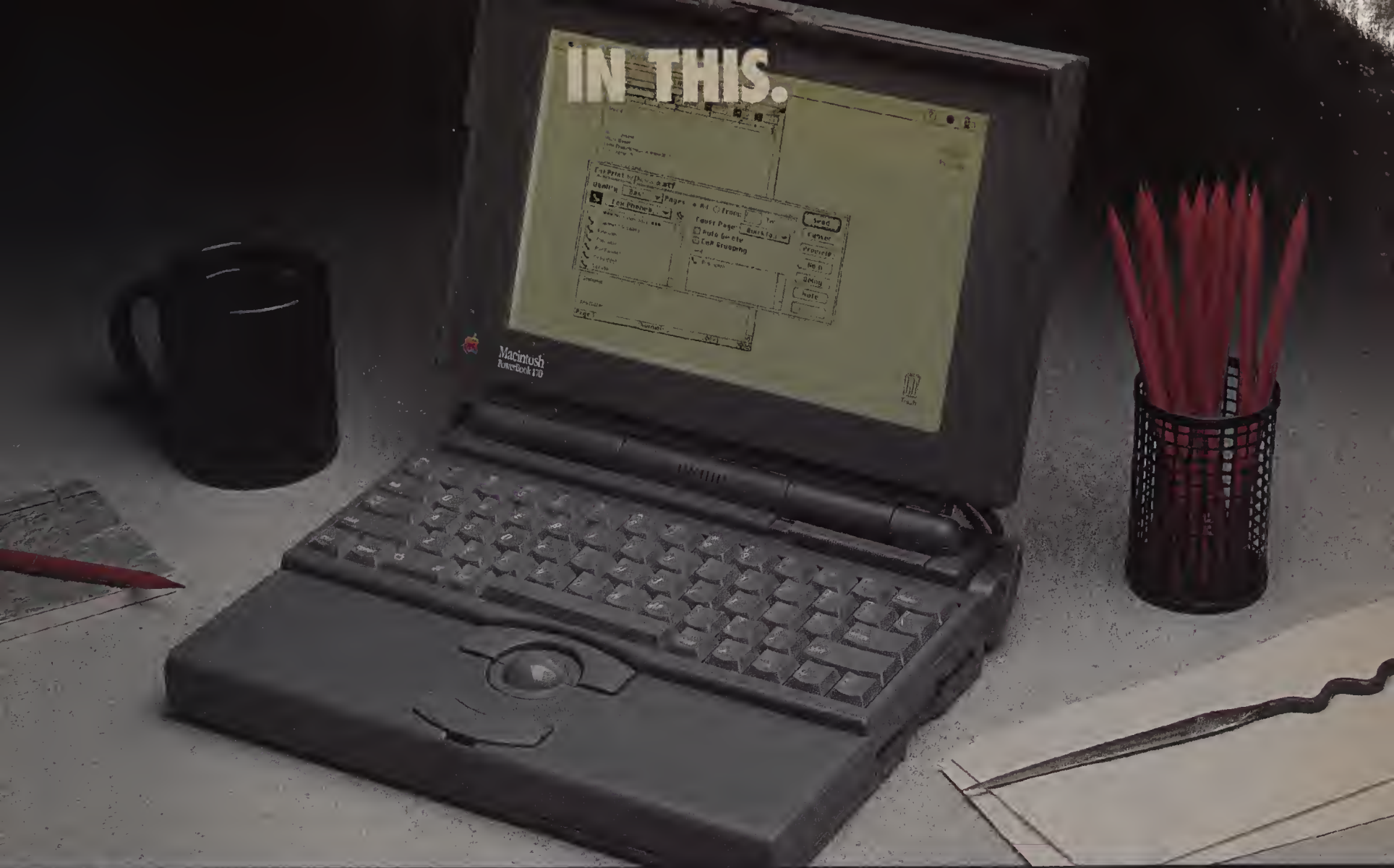
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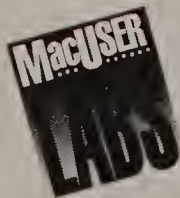
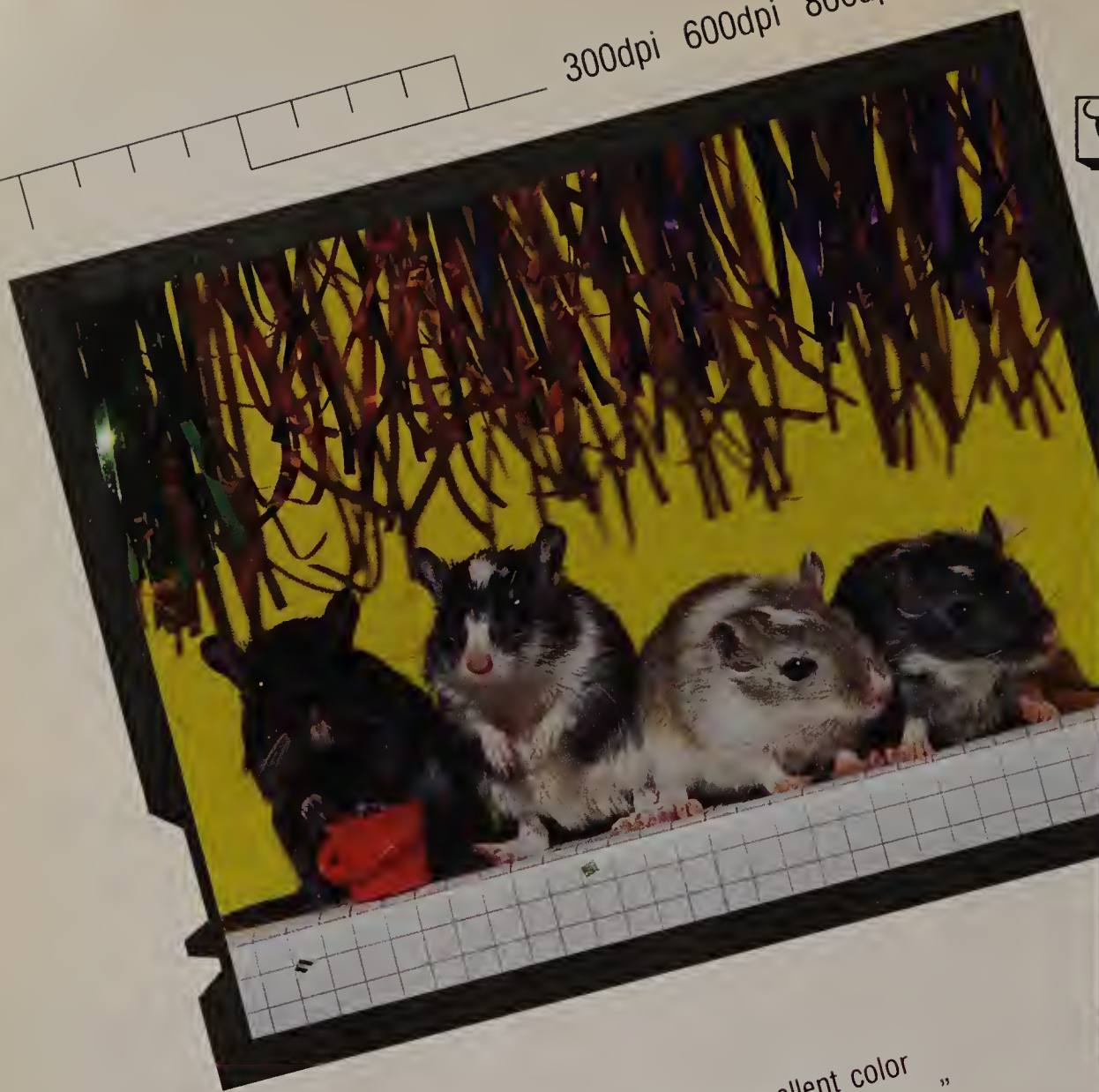


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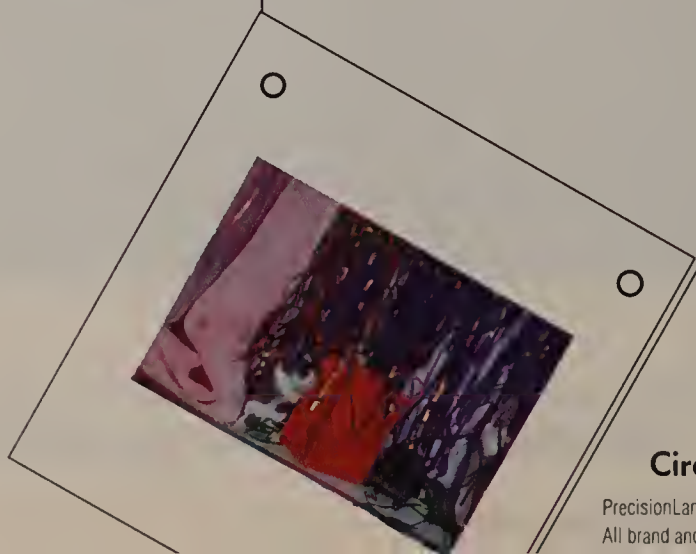


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MacUser, 12/91



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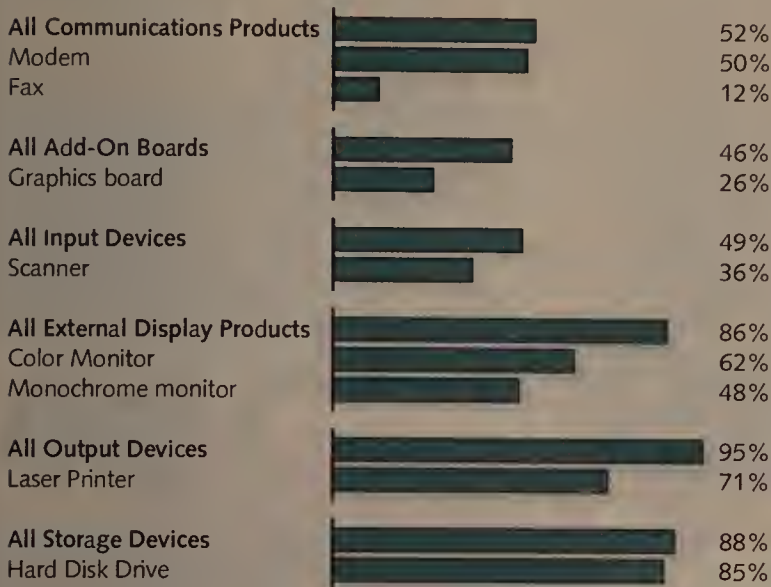
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Circle 274 on reader service card

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Survey: Mac Hardware Used

Hardware products used by subscribers with Macs



Based on 1450 respondents to a 1992 Macworld mail-in subscriber survey. Multiple responses were allowed.

More External Color for PowerBooks

Also designed to support external color monitors for the PowerBook 140 and 170, the SuperView from SuperMac Technology is an external box similar to the PowerView from Radius. Both devices use SCSI to connect to the PowerBook. Unlike the PowerView, the SuperView transfers QuickDraw primitives instead of bitmaps, making it much faster, according to SuperMac. The SuperView includes an internal power supply and does not require the user to carry an external power adapter.

The SuperView supports up to 19-inch color monitors at a maximum resolution of 1024 by 768. It is expected to ship sometime in July at a suggested list price of \$799. SuperMac, 408/245-2202.—T.M.



WITH SUPERVIEW (FRONT), A POWERBOOK 140 OR 170 CAN DRIVE A 19-INCH COLOR MONITOR.



THE MIRROR 16-INCH COLOR DISPLAY HAS 832 BY 624 RESOLUTION AND SELLS FOR \$899.

Mirror Cracks 16-Inch Color Price Barrier

Mirror Technologies has broken new ground in the price of 16-inch color monitors with its Mirror 16-Inch Color Display, which sells for \$899. The monitor has a resolution of 832 by 624

at 72 dpi, a refresh rate of 71Hz, and an antiglare screen.

The Mirror 16-Inch Color Display works with the built-in video on Quadras at 24 bits and 72 dpi, or with the Ilci, the Ilsi, and the LC at the lower resolution of 640 by 480. Mirror is also offering the monitor bundled with an 8-bit adapter for \$1299, with a 16-bit adapter for \$1499, and with a 24-bit adapter for \$1699. All the products are shipping now. Mirror, 612/633-4450.—T.M.



LA CIE IS OFFERING 60MB AND 120MB VERSIONS OF ITS POCKETDRIVE LINE OF HARD DRIVES.

La Cie Offers Tiny Drives

La Cie has added two higher-capacity devices to its PocketDrive series of very small portable hard drives. The 60MB PocketDrive and the 120MB PocketDrive both use 2½-inch Quantum mechanisms and weigh less than a pound each. Both drives have 19ms average access times. The drives should begin shipping by the end of June at an introductory list price of \$579 and \$899 (120MB).

La Cie also said it has begun shipping its Cirrus Optical, a 128MB, 3½-inch erasable optical drive. The Cirrus Optical uses a Panasonic mechanism with a 48ms average access

News

time. The device lists for \$1699, and the 128MB cartridges list for \$99. La Cie, 503/520-9000.—T.M.

Down in the Word Mines

Most organizations' day-to-day operations run on a database of members, customers, or financial accounts. But over time most organizations also accumulate a vast store of knowledge in the form of memos, letters, contracts, reports, and operations manuals. To extract meaning from such a mass of text requires special tools such as Fulcrum Technologies' Ful/Text, a developer's toolkit for creating full-text databases. Ful/Text can index huge amounts of



A NEWLY MOLDED CD BEING PROCESSED AT DISCOVERY SYSTEMS/METATEC'S CD FACTORY.

raw text and partially structured data (such as journal abstracts) and perform complex searches using proximity, wild cards, and so on.

One use of Ful/Text is Nautilus, a computer magazine published on CD ROM by Metatec/Discovery Systems. Metatec developed its own interface for Nautilus and uses the Ful/Text engine to let readers search the CD's contents (Metatec also designs, produces, and manufactures CD ROMs for other companies).

The Ful/Text toolkit starts at \$50,000. Fulcrum is at 613/238-1761. Metatec is at 614/761-2000.—D.L.

J U S T F O R F U N

Surfing the Future Shock Wave

Billed as a "do-it-yourself guide to the future," Beyond CyberPunk is an electronic book/HyperCard stack that simulates an information device of the next century. CyberPunk is a science-fiction subculture that deals with dark visions of a technological future where memory is something you plug in behind your ear and where desperate hackers strive to penetrate the defenses of oppressive and dominant international conglomerates. The stack reviews CyberPunk books, movies, games, art, and so on.

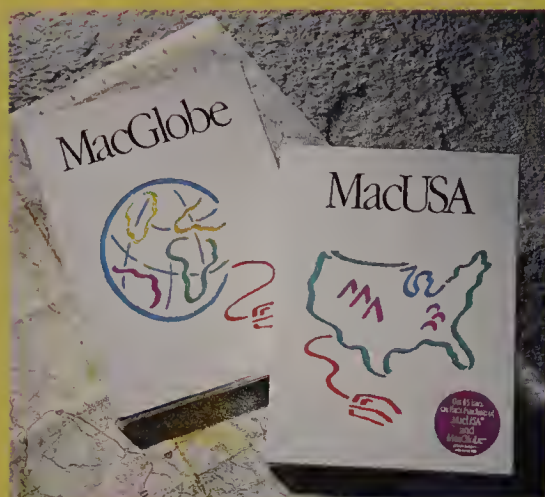
Beyond CyberPunk's four zones include Manifestoes, Media, Street Tech, and Cyberculture. The stack has a number of contributions from well-known science-fiction authors. Beyond CyberPunk lists for \$29.95. Contact Gareth Branwyn, 703/527-6032.—T.M.

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\$39*



FileGuard 2.7

❶ "It's about as much software-based security as you can get in one package." MacUser, March 1992. Protect your Hard Drives and Partitions from unauthorized access (including security bypass with a system diskette), copying and erasure; Applications and File/Folders (including system folder) from unauthorized access, deletion, and/or illegal copying; Desktop (including system folder) from alterations by unauthorized user; Keep an eye on System Usage with the system users log which continuously tracks user/group activity. System 7 compatible. **Publisher: ASD Software**

Single User UT10135

\$139



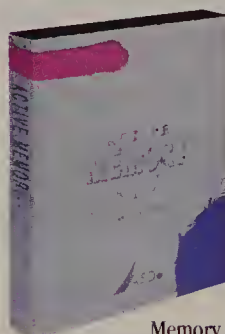
JAG or Ray Dream Designer 2.0*

❶ Remove jaggies! **JAG** works in the background, removing jagged edges from PICT files automatically, producing pixel perfect 8-bit and 24-bit still images and animations. It works with images created in color paint applications and with scanned images. With its sophisticated edge-detection scheme, JAG produces sharp, clear images of superior quality to those produced by edge-blurring filters. **GRA0291 \$65.**

❶ **Ray Dream Designer's** drawing and text tools for creating lines, circles, ellipses, polygons, Beziars, colors and shadings, are virtually the same as those in most 2D illustration programs. But now your objects have the realistic look of three dimensions. It even comes with a library of 3D solid textures to be used as-is or customized. Lighting, shadows, transparency, reflections and perspective are handled automatically. **Publisher: Ray Dream GRA0292**

\$629*

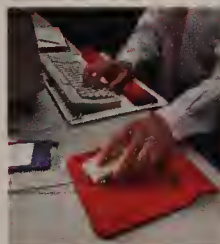
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\$125



WristSaver/ WristSaver MousePad

The WristSaver cradles your wrist with a contoured neoprene rubber pad and a nylon covering. It's ergonomically designed to

support your wrist at the proper angle to help avoid the pain associated with Carpal Tunnel Syndrome. The WristSaver MousePad provides a comfortable rest for your wrist, plus a conventional mouse pad. Simple finger movements replace sliding the entire arm or hand.

Manufacturer: LB Innovators
WristSaverMousePad ACC0635 \$15.
WristSaver ACC0560 \$15.
Bundle BND0033
(Available in Gray, Black, Red or Navy)

\$25



TrueLaser printer or ScanMaker 600ZS*

The **TrueLaser** is Microtek's answer to fast and versatile laser printing. It offers 300 dpi resolution, comes with 35 built-in True Type fonts and is PostScript and HP PCL4 compatible. Its autoswitching capability allows it to change automatically between its AppleTalk, Centronics and RS-232C interfaces. The TrueLaser is also one of the fastest printers in its class. **INP0162 \$1399.**

ScanMaker 600ZS has unbeatable features at an unbelievable price. Captures 24-bit color, 8-bit gray and black and white images at resolutions up to 600 dpi. It's perfect for all the work from comps to final prepress projects. Included with the scanner is the full version of Adobe's Photoshop, the ScanMaker plug-in and Savitar's Scanmatch color calibration software.

Manufacturer: Microtek INP0180

\$1399*

WindoWatch 1.52

❶ Track the hours you spend on a project with WindoWatch. It's a must for professionals who bill their services by the hour (or minute). WindoWatch operates in the background, automatically generating a timesheet as you work. Use WindoWatch to collect and merge timesheets from team members over the network or export timesheet information to a spreadsheet. Don't miss any opportunity to accurately bill your clients. After all, time is money. **Publisher: ASD Software UT10264**



Single User

\$89



Retrospect or Retrospect Remote*

Retrospect - For Power and simplicity in backup, there's Retrospect. Set it up once, and a built-in calendar backs you up again and again, even when you're asleep. Retrospect supports all disk, tape, cartridge and optical devices, so you can decide which storage media best suits your needs. **UT10227 \$147.**

Retrospect Remote - For centralized network backup, get Retrospect Remote. It works just like Retrospect, only it backs up everyone on a network to a single storage device. Your whole network gets Retrospect protection automatically. Retrospect Remote supports 11 nodes on a network. Add more with Remote 10-Packs and Remote 50-Packs. **Publisher: Dantz Development UT10196**

\$264*

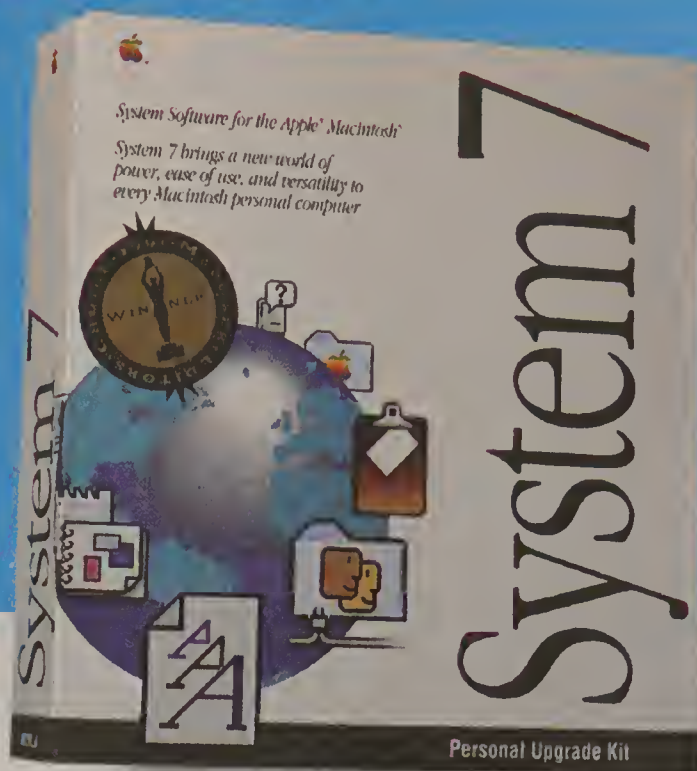
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***\$2.50 shipping and handling charge applies.**



AutoDoubler

AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. In fact, AutoDoubler's new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. UT10254 \$49. UT10280 10 Pack \$299.

DiskDoubler 3.7

DiskDoubler gives you total control of file compression-archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. AutoDoubler and DiskDoubler combined give you the ultimate in speed, convenience, and control. System 7 Savvy!
Publisher: Salient UT10179

\$49

DiVA VideoShop

DiVA VideoShop is an easy but powerful application for creating and editing QuickTime movies. DiVA VideoShop's built in recording module allows you to record video and audio clips directly onto your hard disk. Create QuickTime movies simply by dragging and dropping icons and, add time based transitions, overlays, titling, and filter effects to polish the presentation. DiVA VideoShop allows you up to 16 video and audio tracks for movie layout and layering. Incorporate clip media from The Image Bank CD Collection of 300 movies, 70 music scores, and a sound effects library, all included in the box. Publisher: DiVA GRA0328

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Aldus SuperPaint or Aldus Gallery Effects*



Aldus SuperPaint 3.0

Five time winner of MacWorld magazine's World Class Award, new Aldus SuperPaint combines painting, drawing, and image enhancement, and includes 1 thru 24 bit color, textures, gradients, and EPS graphics. GRA0112 \$133.

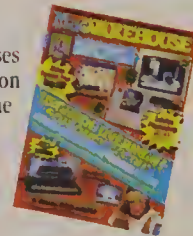
Aldus Gallery Effects 1991 MacUser's Editors' Choice Award for Best Visual Resource. Aldus Gallery Effects automatically transforms grayscale and color bitmap images into stunning, sophisticated art, with 16 master effects including Graphic Pen, Watercolor, and Charcoal. Works directly within programs like SuperPaint and PhotoShop, or as an application or DA.

Publisher: Aldus
GRA0279



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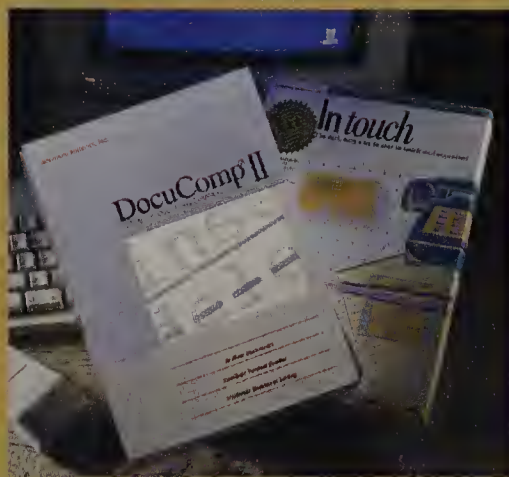
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Publisher



CE SOFTWARE



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Intouch 1.1 Rated "the best name-and-address DA for the Mac," MacUser Magazine, 4/91. Intouch 1.1 is an easy-to-use Desk Accessory that stores unlimited names, addresses, and notes, prints envelopes and labels, dials phone numbers and more! Share your contact information with InTouch Network! Send in your registration card to Advanced Software for a FREE upgrade to version 2.0 UT10192 \$39.

DocuComp II now has dozens of new features and is now System 7 Savvy! Reporting changes is a breeze! Perfect for government, law, aerospace, or wherever documents change over time. Version Control has never been easier! Compares any two document versions, and reports changes as minor as an inserted comma, and as major as a complete rearrangement of text. Save or print a marked-up file, including a separate list of changes. Publisher: Advanced Software DTP0081

\$109

Azimuth 2.1

Azimuth 2.1 draws perspective maps of any country in the world, all 50 states, and the Canadian provinces. It now includes the new independent states formed after the break up of the USSR. It imports text files to add detail to your maps, and plots true great circles. Azimuth uses data files to draw maps from any angle or distance, at any scale you desire. Use the drawing tools to customize the maps with symbols, graphics, layers, and rotatable text. Exports maps in EPS or PICT format. Publisher: GraphSoft BUS0184



\$299



TouchBase 2.0 or DateBook

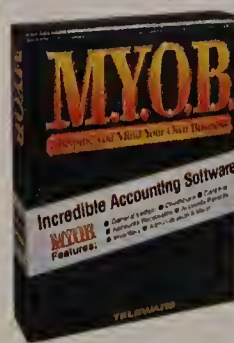
TouchBase 2.0 stores information about personal and business contacts. Automatically capitalizes words and formats phone numbers. It has fields for storing alternative phone numbers, and you can customize the fields. TouchBase prints envelopes and mailing labels, including postalbar codes, plus many other useful forms. DAT0076 \$79.

DateBook is the ultimate personal time manager for Macintosh. Instant access and advanced scheduling keeps you on top of your appointments and things to do. DateBook makes it easy to plan your life. It shows your schedule in multiple formats including test, Gantt chart and time bar. DateBook's views enable you to see your schedule in as much detail as you like as quickly as possible. Publisher: After Hours Software BUS0222

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reports. M.Y.O.B. is seamlessly integrated, fast and very powerful. Designed for the accounting and computer novice, it gives you the powerful features you need without the complications. Special \$40 rebate offer if you purchase by August 30, 1992. Details in M.Y.O.B. box. System 7 Savvy. Publisher: Teleware FIN0087

\$139



ExpertWriter, ExpertColor Paint or Expert Astronomer

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Expert Astronomer is the astronomy program for novices and experts alike. Colorful, clear and precise graphics bring the sky to life. Learn detail information about the stars, planets and constellations just by clicking (over 9,000 celestial objects). You can even track eclipses! Publisher: Softsync EDU0346

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OPTIMA™ 96-Affordable V.32/9600 bps standalone modem. Also supports standard 2400, 1200 bps, and 300 bps communications plus V.42/V.42bis and MNP 5 error-control and data compression. V.42 bis boosts throughput for 38,400 bps performance on dial-up lines. And, free Smartcom for the Mac (\$49 value) and Mac-to-modem cable are included. You don't have to know anything about the modem you're calling. OPTIMA 96 practically operates without you! Automatic Feature negotiation creates the most efficient combination of speed, error-control, and data compression whenever you use your OPTIMA modem. OPTIMA 96-More modem for your money. Manufacturer: Hayes MOD0077



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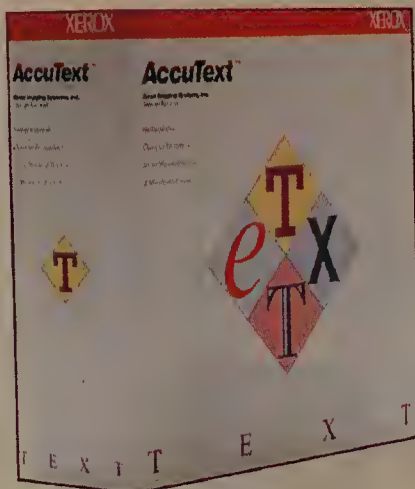


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Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series IIs, IIsx and the Deskjet 500. Prints text and graphics at the printer's maximum resolution.

Does not require PostScript. Cable is included. **Publisher: Insight Development UT10098**

\$95



AccuText 3.0

AccuText 3.0 is Intelligent Character Recognition (ICR) software that allows scanned documents to be recognized and captured to electronic files on the Macintosh, for output to word processing, spreadsheet and desktop publishing applications. AccuText now features an interactive Verifier. This feature increases speed and accuracy by inviting user interaction before processing. AccuText also features System 7 compatibility and support for the HP ScanJet IIc and Apple OneScanner, background processing, format retention, automatic halftone removal, on-screen zoning, support for ten languages, and compatibility with the most popular scanners and software applications for the Macintosh. **Publisher: Xerox Imaging Systems DTP0039**

\$639

FontBank PostScript Display Typefaces

The FontBank PostScript Display typefaces give you a library of 250 type1 PostScript display typefaces. Build a versatile type library with designs ranging from the simple sans serif to the extreme ultra serif. Use them to create attention-getting headlines, sub-headings, titles, logos and special text effects. Included in the package are traditional, decorative, novelty, script, brush and calligraphic faces. Use these faces as a counterpoint to regular text or with design programs. With FontBank fonts, you get full-featured screen and printer fonts at an affordable price.

Publisher: FontBank FON0438



\$95

Virtus WalkThrough 1.11

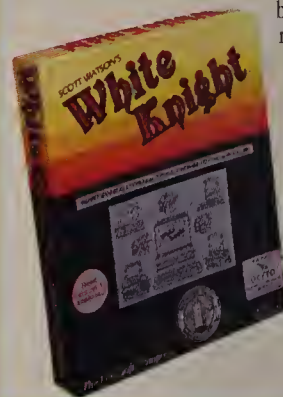
The latest version of this award winning 3-D drawing program provides everything you need to quickly capture and explore your ideas in 3-D. Multiple windows and extensive drawing aids provide an interactive environment for editing and viewing your ideas. Interactive 3-D presentations, QuickTime® and PICS animated movies and perspective pictures dazzle your audiences. Enhanced Imports of 3-D DXF, PICT, Claris®CAD and MacDraw; and Exports of 3-D DXF, 2-D DXF, Claris®CAD, MacDraw, PICT and EPS. Winner of MacUser Breakthrough Product of the Year Award 1990. **Publisher: Virtus Corporation GRA0278**



\$309

White Knight V.11

The perfect low-cost solution to almost any Mac telecommunicator's needs. Offers the kind of power associated with products costing hundreds of dollars more, but is easier to learn and more flexible. 270+ page user manual is geared to all levels of experience. Winner of 11 awards including MacWorld's World Class Software Award 1987-1991. **Publisher: FreeSoft COM0060**



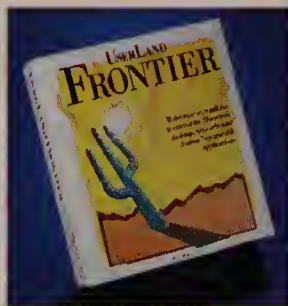
\$85



MacDraft 2.1

Designed specifically for architectural/engineering drawing and drafting and technical illustration. MacDraft provides a fully scaled drafting environment that closely emulates the way you work and think when using a drafting table. Offers a full complement of drawing tools that are designed to provide extensive control over the creation and editing of objects. Tools include lines, circles, rectangles, arcs, polygons, ellipses, splines or Bezier curves, and freehand shapes. MacDraft provides a number of options that allow you to configure tools to meet your drawing needs. Users can create multi-layered scaled drawings in English or metric units, while MacDraft's dimension lines and area calculations are displayed in units of the drawing. MacDraft can even read MacDraw® II files. **Publisher: Innovative Data Design CAD0039**

\$279



UserLand Frontier

With UserLand Frontier, you don't have to choose between pretty icons and the power to customize and automate your Macintosh. For the first time, you can have power and ease-of-use. Frontier has all the development tools you need to get your scripts running quickly, including a full script debugger and structured symbol tables you can watch and edit while your scripts are running. When you're done, you can link scripts into Frontier's editable menu bar, or save them to the Finder desktop. **Publisher: UserLand UT10272**

\$189

Puzzle Master or Crossword Creator*

Puzzle Master - Solve 250 classic New York Times crossword puzzles on your computer-plus a Create Mode for designing and solving your own puzzles. Save partial solutions, print puzzles, answers, and clues. Includes timer and scoring system to test your skills against the experts. **ENT0383 \$29.**

Crossword Creator - Create crossword puzzles quickly and easily on your computer. Just type in the words and Crossword Creator will instantly generate the puzzle. Build your own dictionaries and use them for future puzzles. Includes Roget's II, The New Thesaurus, with wild card search features. Save options include desktop publishing files. Print clues, list, and puzzles. **Publisher: Centron Software ENT0440**

\$39*



Easy Alarms 2.0

The inviting, hassle-free way to organize your schedule, manage your to-do list and be reminded of upcoming events. Colorful calendars with in-the-squares text and pop-up menus make personal schedule and to-do list entries quick and easy. Reminders display text messages, play recorded sounds or execute custom scripts. You can send reminders and voice messages to others on your network, and you can view and edit their calendars. Powers users will appreciate Easy Alarms' extensive scripting and Apple events capabilities. Prints multi-column text, daily & weekly datebooks, and monthly calendars. Excellent for PowerBooks! Both desk accessory (for System 6) and application (for System 7) versions included. **Publisher: Essential Software**

5-User UT10283 \$189.

10-User UT10284 \$325.

Single User UT10292

\$65

POWER USER SIMMS ONLY

\$39*

FREE!
STEP-BY-STEP
VIDEO
INSTRUCTIONS**



A Power User Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spreadsheet. Install extra memory and you can leave a letter open while you refer to last month's sales figures.

You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You'll find installation at home easy when you follow our FREE** step-by-step installation video instructions. Just open your Mac, slide out the main circuit board and plug in your SIMMs.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2 @ \$39 ea.)

The chart explains exactly what you need to achieve the desired level of performance.

To open your Mac Plus, SE, and Classics you'll need a specially designed tool — it's available from us as part of a handy tool kit for just \$9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one megabyte SIMMs card holds eight top quality,

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 150 ns or faster
2 MB	Remove all four existing 256k SIMMs, install two 1 MB Simms, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256k SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
To upgrade a 2-socket Mac Classic II or LC to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
4 MB	Install two 1 MB SIMMs
To upgrade a 2-socket Mac LC II to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 100ns or faster
6 MB	Install two 1 MB SIMMs.
To upgrade a 8-socket Mac II, IIfx, IIfx or SE/30 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 120ns or faster
4 MB	Remove all four existing 256k SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256k SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1MB SIMMs
To upgrade a 4-socket Mac IIfx to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 100ns or faster
5 MB	Install four 1 MB SIMMs.
To upgrade a 4-socket Quadra 700 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
8 MB	Install four 1MB SIMMs.
To upgrade a 16-socket Quadra 900 to this amount of memory	Do this: (Install in multiples of four only) SIMMs must be 80ns or faster
4 MB	Install four 1MB SIMMs.
8 MB	Install eight 1MB SIMMs.
12 MB	Install twelve 1MB SIMMs.

memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120ns SIMMs is \$39.

Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100ns chip. The original Mac used relatively slow 150ns memory chips. The 68020 processor needs 120ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Install a MacWarehouse Expansion Kit and working with your Mac will never be the same! Call us now. We'll help you select just the right Memory Upgrade, and we'll ship it overnight for just \$3.

CHP 0012 120ns SIMMs.....\$39

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1-800-255-6227

Overnight Delivery Only \$3.00!

Call 24 hours a day, 7 days a week

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MACWAREHOUSE 30-DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your Power User Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY.

MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.

* SIMMs prices vary. Call for latest information.

** Limited Offer! Free video with purchase of 2 or more SIMMs.

MWH2P

7 GREAT REASONS

1 Finder 7

The new Finder 7 is worth the cost alone. Access, organize, and view your folders, documents and applications faster and easier with the new improved finder.

2 Balloon Help

Use the new Balloon Help for interactive help while you work. Turn this feature on and point to anything on your screen - a menu item, icon, or tool - and a "balloon" appears, telling you what it is and what it does.

3 File Sharing

With the new File Sharing features you can share hard drives, folders, and files, with others on your network; it has never been easier. You can even set passwords so that only specific individuals or groups can see your files and work with them.

4 Fonts in System 7

Apple's new advanced font technology gives you clear, crisp type on screen in any size plus the ability to print to many different kinds of printers. No more struggle with font compatibility.

5 Multitasking

With System 7 Multitasking is always optional. Now you can run multiple applications at the same time, and switch from one to another with a click of the mouse. System 7 also supports background processing, so that while you're working in your word processor, you can print a document and have your spreadsheet recalculating.

6 System Folder Simplicity

Apple has completely redesigned and improved the System Folder, making it much easier to organize. Predefined subfolders are created automatically, to reduce clutter. The new System Folder includes a Control Panel Folder, Extension Folder, Apple Menu Folder, Preference Folder and Startup Folder.

7 Publish and Subscribe

You can "publish" any part of your document (a graphic, chart or piece of text), to another document even in another application - which "subscribes" to the original. Any changes you make to the original document will automatically appear in the other, even across a network. Now that's live copy and paste!

Plus Your **FREE** System 7 Tutorial from MacWAREHOUSE!

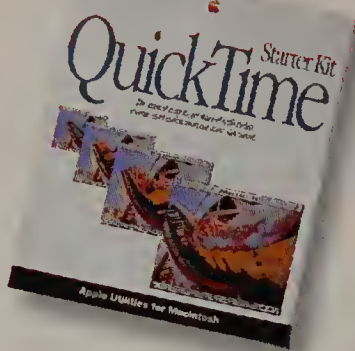
Video, sound, and animation on your Macintosh

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button. QuickTime brings Multimedia to the Mac!

GRA0347

Publisher: Apple Computer, Inc.



\$169

Macintosh PC Exchange

Open PC files on 3.5" MS-DOS and Windows-formatted floppy disks. Read DOS files on your Mac desktop. Open, save, rename, move, copy and delete documents just as if they were Mac files! Customize the program for even faster access. Requires Apple SuperDrive or compatible.

COM0126

Publisher: Apple Computer, Inc.



\$69

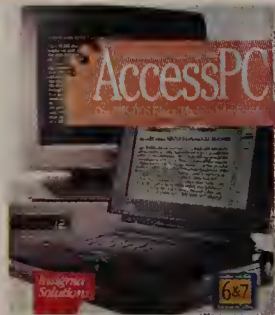
EXCITING NEW APPLICATIONS THAT TAKE FULL

AccessPC 2.0

7 With AccessPC 2.0, your Macintosh can make MS-DOS files look just like Mac files, instantly. Pop any DOS floppy in your drive, and in a couple of clicks, the PC files are on your Mac desktop, looking and acting perfectly Mac-like. Edit, copy, save, print, play with the numbers, print again, and give the PC people back their diskette. It's that easy to use any PC file in any Mac application.

AccessPC is an easy-to-install control panel utility that's always been completely compatible with System 6 & 7.

Publisher: Insignia Solutions
UTI0174



\$60

DiskFit Pro

7 Fast, efficient, easy backup. For Finder-readable backup to floppies, cartridge or other hard disks, get DiskFit Pro. DiskFit Pro copies files from a hard disk to a "SmartSet" of floppies, and then updates that "SmartSet" with each subsequent backup. By replacing only the obsolete files in the backup set, DiskFit Pro keeps your SmartSet from growing every time you back up. Backups stay fast and backup sets compact. And since files stay in Finder format, retrievals are a breeze. Don't leave your data at risk, backup with DiskFit Pro. System 7 Savvy, System 6.x compatible.

Publisher: Dantz Development
UTI0246



\$74



SAM 3.0 or NUM 2.0*

7 SAM 3.0 detects viruses by monitoring the suspicious activities that characterized them. Version 3.0 has enhanced update and repair capabilities, faster scanning, and more. The CDEV portion operates during normal Mac usage, and offers a number of options for checking disks and folders as you work. UTI0214 \$65

7 NUM 2.0 combines and integrates two outstanding collections of Mac utilities: SUM 2.0/NUM 1.1 plus automatic backup, data security (both DES and FasCrypt), and many productivity enhancements. Other utilities recover lost or accidentally deleted files, restore crashed hard disks and more. Publisher: Symantec
UTI0151

\$95*

Overnight Delivery Only \$3.00! Call 24hrs. - 7 days!

TO UPGRADE NOW!

System 7 brings dynamic new capabilities and ease of use to everyone who uses a Mac...

System 7 builds on the Mac basics you already love, and paves the way for a whole generation of powerful new software. A simple click of the mouse installs the software. Then advanced features take over, letting you work faster, easier, and more productively.

- Multitasking provides effortless switching between applications
- Finder 7 lets you customize your desktop to the way you work
- File Sharing allows access to any folder and its contents among workgroups
- Publish & Subscribe lets you update several documents by only changing one
- TrueType gives you crisp, clear type of any size

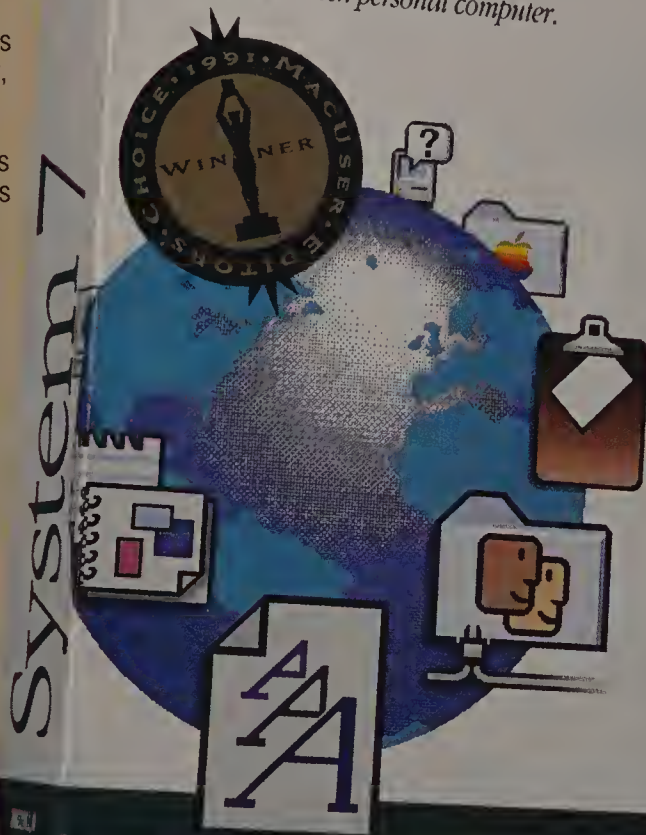
And that's just for starters!

Now it's easier than ever to get System 7 up and running on your Mac, because you can get it right from MacWAREHOUSE! Join the generation of System 7 power users!

Order System 7 today!

System Software for the Apple® Macintosh®

System 7 brings a new world of power, ease of use, and versatility to every Macintosh personal computer.



System 7

\$79

*Limited Offer -- Not Available to Resellers.

**System 7
Personal Upgrade Kit**

SYS0001

Publisher: Apple Computer, Inc.

**System 7
Group Upgrade Kit**

SYS0002 **\$279**

System requirements: 2MB RAM; hard disk drive.

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Make System 7 even easier with this **Personal Training Systems System 7 Tutorial!**

Get up and running with System 7 in a flash! This Personal Training Systems Tutorial is the fastest, easiest way to put all the power of System 7 right to work on your Macintosh desktop. And it's yours **FREE*** with your order for any product from MacWAREHOUSE! Just ask for item #AAA0021 when you place your order.

*\$2.00 shipping and handling charge applies.

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ATM with four FREE fonts! Get the Adobe Type Manager program disk, user guide and registration card **FREE*** from MacWAREHOUSE when you order System 7. You'll also get as a bonus, four Adobe Garamond typefaces from the Adobe originals®. When you place your order for System 7 just ask for item #AAA0023.

*\$2.50 shipping and handling charge applies.



Personal Upgrade Kit

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button.

QuickTime brings Multimedia to the Mac! **GRA0347** Publisher: Apple Computer, Inc. **\$169**

AppleTalk Remote Access

Gain direct access to information and resources from your AppleTalk network. Simple to set up and use. High performance is optimized for a broad range of modems. Provides multiple security levels, and requires only System 7 and a high-speed modem. No special hardware required.

COM0131 Publisher: Apple Computer, Inc. **\$175**

AppleShare 3.0

Connect up to 120 users using a variety of cabling choices. New version offers faster server start up, improved integrity and error handling, plus the ability to mount and unmount removable media while the server is running. **NET0250** Publisher: Apple Computer, Inc. **\$1059**

ADVANTAGE OF THE POWER OF SYSTEM 7!

UserLand Frontier

Frontier is the power user's scripting system for System 7. Write and run your own utilities to customize the Mac file system, networks and applications. Frontier has all the development tools you need to get your scripts running quickly, including a full script debugger and structured control tables you can watch and edit while your scripts are running. When your done, you can link scripts into Frontier's menu bar, or save them in the Finder desktop.

Publisher: UserLand Software
UT10272



\$189

**AutoDoubler or
DiskDoubler 3.7**

AutoDoubler is the easiest way to increase hard disk capacity. It's lightning quick and completely transparent, so it won't interrupt your work. The new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. **UT10254** \$49.

DiskDoubler 3.7 gives you total control of file compression-archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. Combined they give you the ultimate in speed, convenience, and control. System 7 Savvy! Publisher: Salient
UT10179



\$49 ea.

Word 5.0 or Excel 4.0

Microsoft Word 5.0 simplifies word processing, whether you need to dash off a quick memo or create a complex report. Its Ribbon control panel makes changes with a single mouse click. Includes a grammar checker, spelling checker and thesaurus. **WRD0050** \$295.



Publisher: Microsoft
BUS0223
MICROSOFT EXCEL 4.0
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JPG0010

Microsoft Excel 4.0 streamlines the tasks of creating and using a basic spreadsheet. Fully System 7 Savvy, it now allows you to include QuickTime audio/video clips in your spreadsheets. Wizards (Excel's on-line assistants) walk you through complex tasks.

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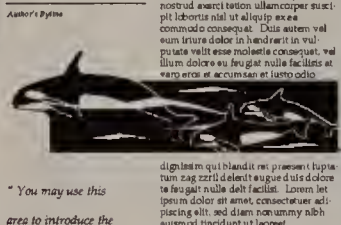
You want all your documents to look polished and professional. You've seen how graphics and charts can jazz up those otherwise dull memos and reports. But trying to do page layout with your word processor is almost impossible. And high-end page layout programs take too much time and effort. Introducing Personal Press 2.0 — the first page layout software that does it all for you — automatically!

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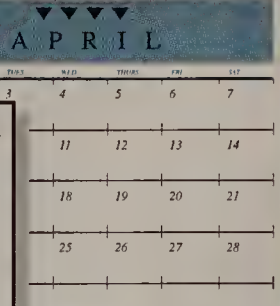
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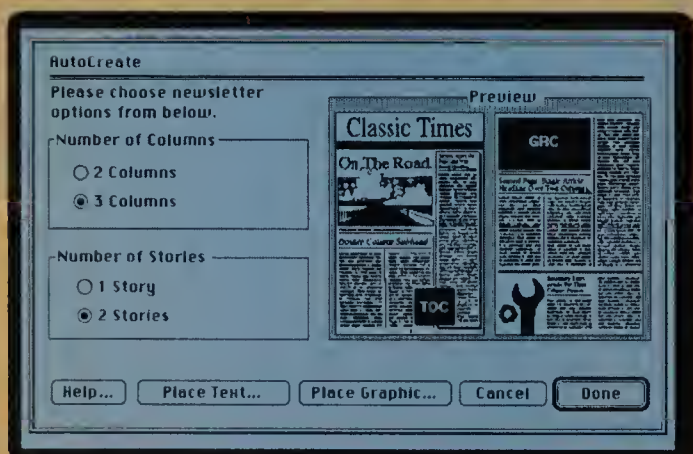


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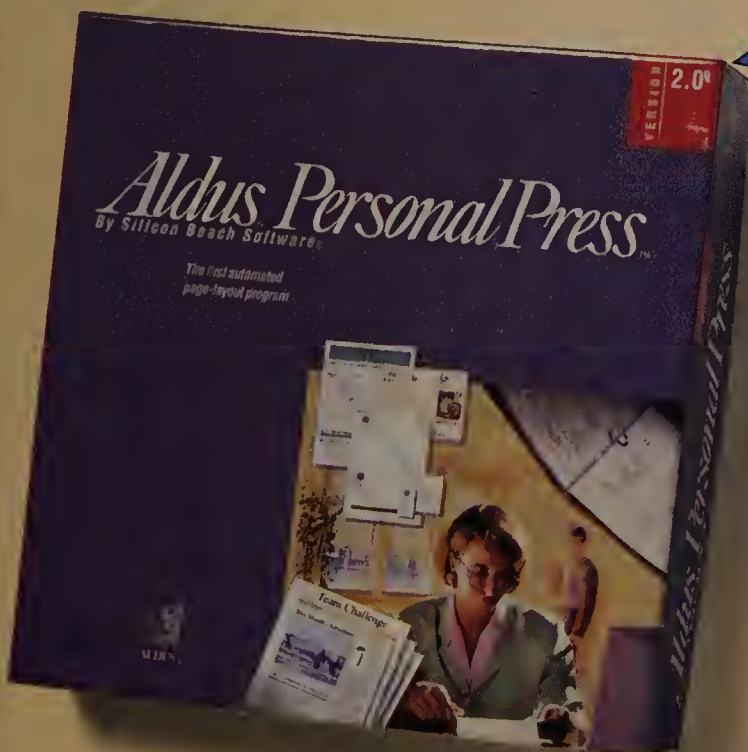
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Makes you look like an expert!**

DTP 0080 FaxFACTS 2502

Publisher: Aldus

Suggested Retail: \$199

\$99
System requirements: Mac Plus or higher (including PowerBook family and Quadra); System 6.0.3 or later (6.0.5 or later recommended); 1 MB RAM (2 MB recommended); hard disk drive.

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MWH2S

Sixth Annual World-Class

Awards

Each month, you turn to

Macworld to find out which hardware and software—from hard drives and monitors to spreadsheets and page-layout programs—we deem

the best on the market. But once a year, we stand back and give you a

READERS PICK

chance to champion *your* favorites—the Macintosh products you

consider world-class winners.

THE TOP

MACINTOSH PRODUCTS

IN 62

CATEGORIES

Early this year, we sent surveys to a randomly selected group of 4000 *Macworld* subscribers who were asked to vote in as many—or as few—categories as they wished, depending on their knowledge and experience in each area. In all but five write-in categories, survey respondents were given a list of products—1950 in all—from which to choose; they could also write in a candidate if it did not appear on the list.

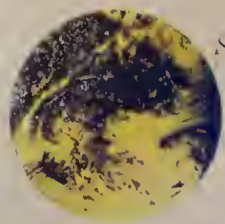
The balloting process was the same as last year's, with one major exception: all Apple-label products were eliminated from the lists and disqualified from the write-in categories. Apple certainly makes good products. But the built-in advantage of the Apple logo unfairly pushed many deserving vendors out of contention in prior years. We wanted to recognize third-party developers for their hard work and pioneering spirit in creating high-quality products for the Mac.

Survey results were tabulated by an independent research firm, Wilson Associates. On the following pages, we showcase this year's 74 award winners.

Some things never change. At least it seems that way for companies that had winning product lines for the sixth consecutive year. In the hardware categories, Hayes Microcomputer Products again won for its 2400-baud and 9600-baud series of modems. Radius took the honors in the monochrome monitor category—this year, as last, for the popular Pivot. In software, Microsoft Excel and Word easily beat the competition in the spreadsheet and word processing arenas, Claris's FileMaker Pro and MacProject took the end-user database and project-management awards, and Aldus PageMaker dominated the page-layout category.

BY CATHY ABES





Sixth Annual

World-Class Awards

Stepping into the Spotlight

ROUGHLY HALF OF THIS YEAR'S TOP vote-getters were repeat winners from last year, though many found themselves sharing honors with one or two competitors. A newcomer in the hardware arena catapulted straight to the top, however. Radius's Color Pivot matched the quick success of its older monochrome sibling, winning best color monitor. And Hewlett-Packard products took unprecedented top honors in every printer and scanner category—five in all.

On the software side, Kid Pix, Broderbund Software's innovative new color-paint program for children won the education category. CE Software's QuickMail narrowly upset Microsoft Mail in electronic mail. Symantec's More II (a winner in previous years) and CE Software's Calendar-Maker tied for first place in a new category, organization/productivity tool.

Adobe Type Manager, a winner for the third year in a row, eclipsed its competitors in a new category, utility—font/print management, with 76 percent of votes. Although HyperCard managed to hang on to the top spot among authoring tools, that lead slipped compared to last year—from 70 to 55 percent—while MacroMind Director moved into second place. Despite Adobe Illustrator's having to share the top award

in the drawing/illustration arena with its main competitor, Aldus FreeHand, Adobe has to be pleased with its rising star in the image processing category; taking a decisive 74 percent of votes, Adobe Photoshop's ascendancy is indisputable. And close on the heels of this year's modeling/rendering winner, Macromedia's Swivel 3D Pro, were two new contenders, Pixar's MacRenderMan and Macromedia's Three-D.

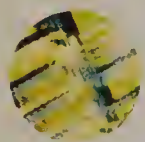
No Clear Winners

APPLE'S ELIMINATION FROM THE COMPETITION gave some third parties deserved recognition, but in a few cases—MIDI interface, tape drive, best newcomer (hardware and software), and best hardware support—none of the remaining contenders emerged with a significant lead. And in a few other areas where Apple has never competed, no company could muster a decisive electoral margin. In categories where four or five products were deadlocked, we gave no awards but wish to recognize the top vote-getters. La Cie, MicroNet Technology, Hewlett-Packard, and Pinnacle Micro tied for best optical drive; Technology Works' GraceLAN, Novell's LANalyzer Network Analyzer, and TrafficWatch and CheckNet (both from Farallon Computing) tied for network management; Mark of

the Unicorn's MIDI Time Piece, Opcode Systems' Studio 3 and Studio 5, Passport Designs' MIDI Transport, and Altech Systems' MidiFace series tied for MIDI interface; MicroNet, La Cie, GCC Technologies, PLI, and Tecmar tied for tape drive; and RasterOps' Video ColorBoard 364 and 24STV/24XLTV, Truevision's NuVista+, Koala Acquisitions' MacVision, and Radius's RadiusTV tied for video capture/output.

Finally, we'd like to acknowledge the winning vendors, who so generously donated products for the World-Class product giveaway. Thanks to them, each of the following 12 lucky subscribers randomly chosen from the returned ballots will receive a selection of this year's World-Class products:

T. Kevin Coker of San Francisco, California; Douglas Diedrick of Minneapolis, Minnesota; Jim Grasley of Tacoma, Washington; Marie Kleinrock of Berkeley, California; Richard W. Martin of Mount Clemens, Michigan; David Pierce of La Mesa, California; Joy Shipman of Housatonic, Massachusetts; M. S. Smith of Annandale, Virginia; John Stringer of Lake Villa, Illinois; Marianne I. Tromp of Madison, Wisconsin; Arden R. Varney of Brookline, Massachusetts; and Jeff Wilbur of Oakland, California.



H A R D W A R E

Some percentages do not equal 100 due to rounding. Due to statistical margins of error, some two- or three-way ties were declared, including a few in cases that show apparently large disparities in voting percentages.

Product; Manufacturer

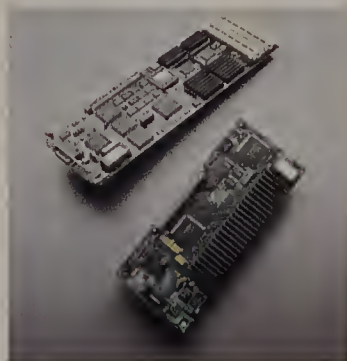
% of votes

Color Graphics Board—8-Bit



RasterOps 8 series; RasterOps	21
Radius PrecisionColor series; Radius	16
Spectrum/8 series; SuperMac Technology	15
Radius DirectColor series; Radius	10
Thunder/8; SuperMac Technology	7
Others	30
(19% of respondents voted in this category)	

Color Graphics Board—24-Bit

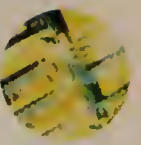


Product; Manufacturer	% of votes
Radius DirectColor series; Radius	29
RasterOps ColorBoard 24 series; RasterOps	26
Spectrum/24 series; SuperMac Technology	12
Thunder/24; SuperMac Technology	11
Futura EX; E-Machines	6
Others	16
(23% of respondents voted in this category)	

CPU/Accelerator Upgrade



Radius Rocket (68040 upgrade); Radius	22
Fast Cache IIci; DayStar Digital	11
PowerCard 030 series; DayStar Digital	8
Radius Accelerator series; Radius	8
PowerCache series; DayStar Digital	7
Others	44
(25% of respondents voted in this category)	



Product; Manufacturer

% of votes

Digital Audio/Music Hardware

MacRecorder Sound System; Macromedia	60
Audiomedia; Digidesign	10
Voice Impact Pro; Articulate Systems	9
MacProteus; Digidesign	6
Pro Tools; Digidesign	6
Others	9

(20% of respondents voted in this category)

Ethernet Hardware

PhoneNet Card for Ethernet; Farallon Computing	15
GatorBox; Cayman Systems	15
Asanté 10T Hub series; Asanté Technologies	11
PhoneNet StarController EN, Series 500; Farallon	8
FastPath 5; Shiva	7
Others	45

(18% of respondents voted in this category)

Hard Drive—Under 80MB

La Cie	16
GCC Technologies	8
Mirror Technologies	6
Ehman*	6
Others	58

(44% of respondents voted in this category)

*Has recently sold its product lines; see Conspicuous Consumer, this issue, for details.

Hard Drive—80MB to 200MB

La Cie	17
GCC Technologies	7
APS	7
MicroNet Technology	6
Mirror Technologies	6
Others	57

(38% of respondents voted in this category)

Hard Drive—Over 200MB

MicroNet Technology	11
La Cie	10
FWB	10
APS	7
GCC Technologies	6
Others	57

(23% of respondents voted in this category)

Input Device—Keyboard, Tablet, Pointing Device

Turbo Mouse; Kensington Microware	29
Mac-101E Keyboard; Prometheus Products	11
Wacom Tablets; Wacom Technology	10
Voice Navigator II; Articulate Systems	6
A+ Mouse; Mouse Systems	3
Silhouette Trackball; EMac	3
Others	38

(41% of respondents voted in this category)

LocalTalk Hardware

PhoneNet Connector; Farallon Computing	61
PhoneNet StarController, Series 300; Farallon Computing	12
NetBridge; Shiva	6
NetSerial; Shiva	4
TurboNet series; Nuvotech	4
Others	14

(26% of respondents voted in this category)

Mac-to-PC/Mainframe Communications

PhoneNet Card PC for LocalTalk; Farallon Computing	32
MacIRMA; Digital Communications Associates	11
MacMainFrame series; Avatar	8
TOPS FlashCard; Sitka	6
Netway series; Tri-Data Systems	5
Others	38

(17% of respondents voted in this category)

Modem—2400-Baud

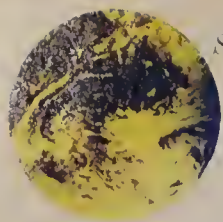
Hayes Microcomputer Products	31
Zoom Telephonics	16
Practical Peripherals	10
Supra	6
Global Village Communication	5
Others	33

(45% of respondents voted in this category)

Modem—9600-Baud

Hayes Microcomputer Products	33
U.S. Robotics	10
Zoom Telephonics	9
Telebit	6
Shiva	6
Others	35

(25% of respondents voted in this category)



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HARDWARE

Product, Manufacturer

% of votes

Modem—Fax



DoveFax series; Dove Computer *	30
Zoom Modems; Zoom Telephonics	25
InterFax 24/96; Abaton	9
Teleport/Fax 9600; Global Village Communication	9
ProModem series; Prometheus Products	7
Others	20
(26% of respondents voted in this category)	
*Company reorganizing under Chapter 11.	

Printer—Other



Product, Manufacturer

% of votes

HP DeskWriter; Hewlett-Packard	58
KX-P1124i; Panasonic	5
Diconix M150 Plus; Eastman Kodak	5
WriteImpact; GCC Technologies	4
WriteMove; GCC Technologies	4
Others	24
(35% of respondents voted in this category)	

Monitor—Color



Radius Color Pivot; Radius	15
ColorPage T16; E-Machines	10
SuperMac 20" Dual-Mode Trinitron; SuperMac Technology	8
SuperMatch 21 Two-Page Color Display; SuperMac Technology	6
Radius PrecisionColor Display/19; Radius	6
Radius PrecisionColor Display/21; Radius	5
Others	51
(37% of respondents voted in this category)	

Removable-Media Drive



Bernoulli series; Iomega	23
Infinity40 Turbo; PLI	13
DataPak series; Mass Microsystems	8
Syquest 45; Club Mac	5
44-Removable; Ehman*	5
Others	46
(30% of respondents voted in this category)	
*Has recently sold its product lines; see Conspicuous Consumer, this issue, for details.	

Monitor—Monochrome



Radius Pivot; Radius	24
Radius Two Page Display 21; Radius	11
Radius Two Page Display 19; Radius	9
Radius Full Page Display; Radius	7
19" Platinum Display; SuperMac Technology	4
21" Platinum Two-Page Display; SuperMac Technology	4
Others	40
(29% of respondents voted in this category)	

Scanner—Black-and-White/Gray-Scale



HP ScanJet series; Hewlett-Packard	28
MSF-300G/GS; Microtek	12
LightningScan series; Thunderware	8
ThunderScan Plus; Thunderware	7
ScanMan Model 32; Logitech	6
Others	40
(29% of respondents voted in this category)	

Printer—Color



HP DeskWriter C; Hewlett-Packard	28
Phaser III PXi; Tektronix	13
HP PaintJet XL; Hewlett-Packard	12
ColorScript 100 series; QMS	6
HP PaintWriter XL; Hewlett-Packard	6
Others	35
(28% of respondents voted in this category)	

Scanner—Color



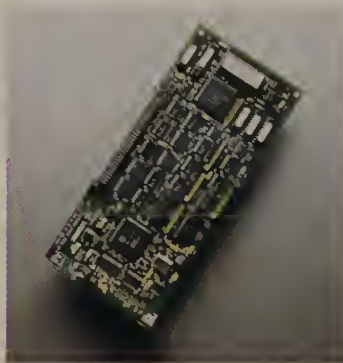
HP ScanJet IIc; Hewlett-Packard	20
Silverscanner; La Cie	17
ScanMaker 600ZS; Microtek	15
Agfa Focus Color Scanner; Agfa Compugraphics Division	5
ScanMaker 1850S; Microtek	4
Others	40
(22% of respondents voted in this category)	

Printer—Laser



HP LaserJet series; Hewlett-Packard	35
BLP series; GCC Technologies	13
PS 410; QMS	5
PLP series; GCC Technologies	5
QMS-PS 810/820 Turbo; QMS	5
Others	37
(46% of respondents voted in this category)	

Video Editing/Effects



VideoSpigot, VideoSpigot Pro; SuperMac Technology	28
Sony Vdeck, Sony Vbox; Sony	22
QuickView Studio Multimedia Workstation; E-Machines	9
Avid/1 Media Composer; Avid Technology	8
PC-VCR; NEC Technologies	8
Others	25
(11% of respondents voted in this category)	



SOFTWARE

Some percentages do not equal 100 due to rounding. Due to statistical margins of error, some two-way ties were declared.

Product; Manufacturer

% of votes

Authoring Tool



HyperCard; Claris
MacroMind Director; Macromedia
Aldus SuperCard; Silicon Beach Software
Authorware Professional; Macromedia
Course Builder; Telerobotics International
Others
(36% of respondents voted in this category)

55
27
10
4
1
4

Business Accounting



M.Y.O.B.; Teleware
Peachtree Accounting for Macintosh (atOnce);
Peachtree Software
Great Plains Accounting; Great Plains Software
Accountant, Inc. Pro; Softsync/Bloc
Multiledger; CheckMark Software
Others
(21% of respondents voted in this category)

17
11

10
9
6
48

Business Presentation Graphics



Aldus Persuasion; Aldus
Microsoft PowerPoint; Microsoft
DeltaGraph Pro; DeltaPoint
More II; Symantec
CA-Cricket Presents; Computer Associates
Others
(43% of respondents voted in this category)

40
22
9
7
6
17

CAD/Drafting



Claris CAD; Claris
AutoCAD; Autodesk
MacDraft; Innovative Data Design (IDD)
Ashlar Vellum 3D; Ashlar
Dreams; Innovative Data Design (IDD)
Virtus WalkThrough; Virtus
Others
(24% of respondents voted in this category)

29
12
11
7
7
6
28

Product; Manufacturer

% of votes

Database—Developer Tool



4th Dimension; ACIUS
FoxBase+/Mac; Microsoft
Double Helix; Odesta
Oracle for the Macintosh; Oracle
Omnis 5 w/Express; Blyth Software
nuBASE for the Mac; New Era Software Group
Others
(28% of respondents voted in this category)

39
26
14
7
6
3
5

Database—End User



FileMaker Pro; Claris
Microsoft File; Microsoft
Panorama; ProVue Development
RecordHolder Plus; Software Discoveries
File Force; ACIUS
MyAdvancedDatabase; MySoftware Company
Others
(42% of respondents voted in this category)

71
10
8
2
2
1
7

Drawing/Illustration



Adobe Illustrator; Adobe Systems
Aldus FreeHand; Aldus
MacDraw, MacDraw Pro; Claris
Canvas; Deneba Software
MacDraft; Innovative Data Design (IDD)
Others
(67% of respondents voted in this category)

26
24
23
18
2
7

Education



Kid Pix; Broderbund Software
Where in the World Is Carmen Sandiego?; Broderbund
Where in Time Is Carmen Sandiego?; Broderbund
Reader Rabbit; The Learning Company
Where in the USA Is Carmen Sandiego?; Broderbund
Others
(38% of respondents voted in this category)

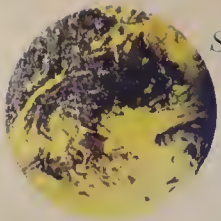
26
10
5
4
4
51

Electronic Mail



QuickMail; CE Software
Microsoft Mail; Microsoft
cc:Mail; cc:Mail
WordPerfect Office for Macintosh; WordPerfect
InBox; Sitka
Others
(26% of respondents voted in this category)

42
35
7
6
5
5



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World-Class Awards

SOFTWARE

Product; Manufacturer

% of votes

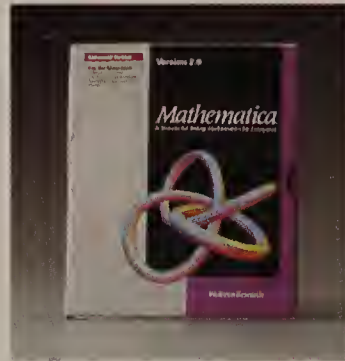
File Server



NetWare for Macintosh; Novell	29
MacTOPS; Sitka	27
DataClub Classic/Elite; Novell	11
EtherShare; Helios	5
MacLan Connect; Miramar Systems	4
Others	25

(18% of respondents voted in this category)

Mathematics



Mathematica; Wolfram Research	60
Theorist; Prescience	10
MathCAD; MathSoft	9
MatLab; The MathWorks	5
TK Solver Plus; Universal Technical Systems	5
PowerMath II; Central Products	3
Others	8

(20% of respondents voted in this category)

Game



Microsoft Flight Simulator; Microsoft	11
SimCity; Maxis	8
Tetris; Spectrum HoloByte	7
Crystal Quest; Casady & Greene	5
PGA Tour Golf; Electronic Arts	4
Shanghai; Activision	4
Others	63

(56% of respondents voted in this category)

Modeling/Rendering



Swivel 3D Professional; Macromedia	20
MacRenderMan; Pixar	13
Three-D; Macromedia	10
StrataVision 3D; Strata	9
Aldus Super 3D; Silicon Beach Software	8
Infini-D; Specular International	7
Others	32

(20% of respondents voted in this category)

Image Processing



Adobe Photoshop; Adobe Systems	74
Aldus Digital Darkroom; Silicon Beach Software	10
Aldus PrePrint; Aldus	4
ImageStudio; Letraset USA	3
ColorStudio; Letraset USA	3
Others	6

(37% of respondents voted in this category)

Multimedia/Animation



MacroMind Director; Macromedia	55
MediaMaker; Macromedia	21
FilmMaker; Macromedia	4
AddMotion; Motion Works	4
Showplace; Pixar	3
Animation Works; Gold Disk	3
Others	13

(19% of respondents voted in this category)

Integrated Application



Microsoft Works; Microsoft	52
ClarisWorks; Claris	23
Microsoft Office; Microsoft	13
GreatWorks; Symantec	5
WordPerfect Office for Macintosh; WordPerfect	2
RagTime 3; MacVonk USA	1
Others	3

(38% of respondents voted in this category)

Music Notation



Finale; Coda Music Software	28
ConcertWare; Great Wave Software	17
Deluxe Music Construction Set; Electronic Arts	14
Encore; Passport Designs	14
Professional Composer; Mark of the Unicorn	11
MusicProse; Coda Music Software	5
Others	11

(15% of respondents voted in this category)

Mac-to-PC/Mainframe Communications



SoftPC; Insignia Solutions	27
DOS Mounter; Dayna Communications	13
VersaTerm Pro; Synergy Software	9
LapLink Mac; Traveling Software	6
NetWare; Novell	6
MacLRMA; Digital Communications Association	5
Others	35

(26% of respondents voted in this category)

Music Sequencing



Performer; Mark of the Unicorn	17
Studio Vision; Opcode Systems	10
Vision; Opcode Systems	9
Pro 4; Passport Designs	9
EZVision; Opcode Systems	8
Others	48

(12% of respondents voted in this category)



Product; Manufacturer

% of votes

Network Utility



Timbuktu, Timbuktu/Remote; Farallon Computing	43
Carbon Copy Mac; Microcom	14
PhoneNet Liaison; Farallon Computing	13
Public Folder; Claris	10
LapLink Mac; Traveling Software	7
Others	14
(20% of respondents voted in this category)	

OCR



OmniPage; Caere	67
Read-It; Olduvai	9
WordScan, WordScan Plus; Calera Recognition Systems	9
AccuText; Xerox Imaging Systems	4
ReadRight for Macintosh; OCR Systems	4
Others	8
(23% of respondents voted in this category)	

Organization/Productivity Tool



More II; Symantec	11
CalendarMaker; CE Software	11
Address Book Plus; Power Up Software	6
TouchBase; After Hours Software	6
Smart Alarms with Appointment Diary; JAM Software	6
Dynodex; Portfolio Systems	5
Others	55
(31% of respondents voted in this category)	

Page Layout



Aldus PageMaker; Aldus	61
QuarkXPress; Quark	22
Publish-It Easy; Timeworks	4
ReadySetGo; Letraset USA	4
FrameMaker; Frame Technology	3
Aldus Personal Press; Silicon Beach Software	2
Others	5
(64% of respondents voted in this category)	

Painting



Aldus SuperPaint; Silicon Beach Software	31
Adobe Photoshop; Adobe Systems	17
MacPaint; Claris	15
PixelPaint, PixelPaint Pro; SuperMac Technology	8
Kid Pix; Brøderbund Software	7
Studio/8, Studio/32; Electronic Arts	4
Others	19
(56% of respondents voted in this category)	

Product; Manufacturer

% of votes

Personal Finance



Quicken; Intuit	59
Managing Your Money; Meca Software	16
MacMoney; Survivor Software	9
Dollars & Sense; Software Toolworks	6
WealthBuilder; Reality Technologies	2
Others	7
(49% of respondents voted in this category)	

Programming Language



Think C; Symantec	50
Think Pascal; Symantec	16
QuickBASIC; Microsoft	11
Microsoft Fortran; Microsoft	5
Prograph; TGS Systems	2
Smalltalk/V Mac; Digitalk	2
Others	15
(26% of respondents voted in this category)	

Project Management



MacProject II; Claris	56
Microsoft Project; Microsoft	18
FastTrack Schedule; AEC Software	8
Micro Planner Manager, Micro Planner X-Pert;	4
Micro Planning	
MacSchedule, MacSchedule Plus; Mainstay	4
KeyPlan; MacVonk USA	2
Others	8
(24% of respondents voted in this category)	

Spreadsheet

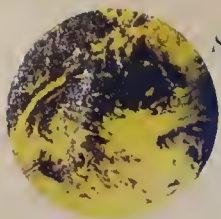


Microsoft Excel; Microsoft	82
Wingz; Informix Software	7
Claris Resolve; Claris	6
Full Impact; Ashton-Tate	1
Trapeze; DeltaPoint	1
MacCalc; Bravo Technologies	1
Others	2
(69% of respondents voted in this category)	

Statistics



StatView series; Abacus Concepts	25
SYSTAT; SYSTAT	20
SPSS for the Macintosh; SPSS	13
Data Desk; Data Description	9
JMP; SAS Institute	9
Statistica/Mac; StatSoft	6
Others	18
(15% of respondents voted in this category)	



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SOFTWARE

Product; Manufacturer

% of votes

Tax Preparation/Planning

**MacInTax; ChipSoft**

Taxview Professional; ChipSoft
 if:X Personal Tax Analyst; ChipSoft
 HyperTax Tutor; Softstream International
 TaxSmith series; Double Scorpio Software
 Others
 (37% of respondents voted in this category)

92

2

1

1

1

1

2

Product; Manufacturer

% of votes

Utility—Protection/Recovery/Backup

**The Norton Utilities for the Mac; Symantec**

Symantec Antivirus for the Mac (SAM); Symantec
 Symantec Utilities for the Mac (SUM); Symantec
 MacTools Deluxe; Central Point Software
 DiskDoubler; Salient Software
 Virex; Microcom
 Others
 (67% of respondents voted in this category)

31

12

9

8

6

4

29

Telecommunications

**MicroPhone II; Software Ventures**

WhiteKnight; The FreeSoft Company
 Smartcom II; Hayes Microcomputer Products
 VersaTerm Pro; Synergy Software
 Quick Link II; Smith Micro Software
 MacKnowledge; Prometheus Products
 Others
 (39% of respondents voted in this category)

29

25

19

8

5

4

9

Utility—System Enhancement

**After Dark; Berkeley Systems**

Suitcase II; Fifth Generation Systems
 Now Utilities; Now Software
 QuicKeys; CE Software
 Pyro; Fifth Generation Systems
 DiskExpress II; ALSoft
 Others
 (59% of respondents voted in this category)

35

17

8

8

5

4

24

Training

**MacAcademy**

Personal Training Systems
 Aldus
 Heizer Software
 Individual Software
 FlipTrack Learning Systems
 Others
 (18% of respondents voted in this category)

45

21

15

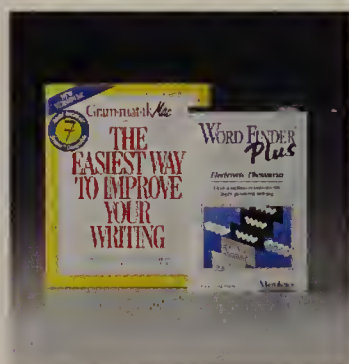
4

2

1

12

Utility—Word Processing

**Grammatik Mac; Reference Software**

Word Finder/Word Finder Plus; Microlytics
 Correct Grammar; Writing Tools Group
 RightWriter; Que Software
 BigThesaurus; Deneba Software
 Others
 (41% of respondents voted in this category)

17

14

12

8

7

43

Utility—Application Enhancement

**SuperGlue; Portfolio Systems**

Exposure Pro; Baseline Publishing
 ConvertIt; Heizer Software
 4thRight Professional; Digital Concepts
 Programmer's Assistants; Aladdin Systems
 DrawTools; Macromedia
 Others
 (11% of respondents voted in this category)

27

11

8

8

8

6

31

Word Processor

**Microsoft Word; Microsoft**

MacWrite II; Claris
 WordPerfect for the Macintosh; WordPerfect
 WriteNow; T/Maker
 Nisus; Paragon Concepts
 FullWrite Professional; Ashton-Tate
 Others
 (89% of respondents voted in this category)

65

14

8

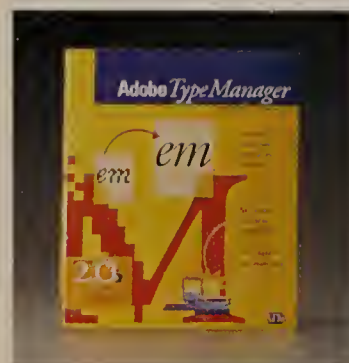
6

2

2

3

Utility—Font/Print Management

**Adobe Type Manager (ATM); Adobe Systems**

TypeStyler; Brøderbund
 Fontographer; Altsys
 FontMonger; Ares Software
 Freedom of Press; Custom Applications
 Others
 (51% of respondents voted in this category)

76

5

3

2

2

13

Best Customer Support—Software

**Microsoft**

Aldus
 Claris
 Adobe Systems
 Symantec
 MacConnection
 Others
 (47% of respondents voted in this category)

18

11

8

5

5

4

49

A Step toward the Future

Apple introduces the technology behind its first hand-held computer

AT THIS YEAR'S CONSUMER ELECTRONICS Show in Chicago, Apple introduced its first personal digital assistant (PDA)—a low-cost, hand-held device aimed not at computer enthusiasts but at anybody who needs to organize schedules, names, addresses, and events. The first products in Apple's PDA line will have the name Newton, will ship in early 1993, and will be manufactured by Sharp. These PDAs will be personal, portable, flexible, and relatively inexpensive (under \$1000). Although it is still too early to report on exact product details, the broad outlines of Apple's new technology are clear enough for a preview of what the PDA product line will be like.

Apple's PDAs won't be miniature Macs, they will run an entirely new operating system. You won't see a desktop; open up applications to create documents; or navigate documents, files, and folders with the Finder. The PDA won't include a keyboard. Instead, you'll open the cover on a hand-held device and use a penlike stylus to write directly on the screen. The software Apple will provide with the PDA will recognize the information that you write, convert it into digital form, and store it in a free-form database. An icon bar will give you tools to do things with this data, such as add it to an address book or a to-do list; search for particular items; schedule meetings on a calendar; format text into a standard business letter, memo, or fax cover sheet; or place data in an out basket for

BY LIZA WEIMAN
and TOM MORAN



MARK JOHANN

communication with the larger world.

Instead of being a multipurpose computer that can be programmed to do virtually anything, a PDA will do a few things exceedingly well. Apple's first PDAs will capture, organize, and communicate the kind of data that you're likely to collect or carry outside of the office—names, addresses, memos, to-do items, drawings, and calendar items. Apple will ship a “docking” program for Macs and PCs that will let you create any kind of data entry form and run a virtual PDA on your computer screen. Docking will enable you to back up and share the data that you collect on the road. You'll connect the PDA to the Mac via the PDA's serial port or with an infrared device.

Apple's first hand-held computer—Newton—is just small enough to grasp firmly in one hand.

A paper organizer can hold all of this information too, but it can't help you link related items, nor can it keep you from entering information in more than one place. But a PDA can, or at least that's the vision of a PDA that Apple has. Here's how it is supposed to work:

Write Sharon's name and address in the address book, then write Call Sharon in your notebook. Circle the phrase, tap once, and all of the Sharons in your address book appear in a small window at the bottom of the screen, phone numbers and all. If your PDA has a modem, you can highlight a phone number and tap the telephone icon to dial your phone.

Write Lunch with Janet, Friday. The PDA understands that lunch is a noon meeting that lasts an hour, that Janet must be Janet Smith (the only Janet in the address book), and that Friday means this coming Friday. The PDA schedules the meeting on your calendar for you.

Scribble two paragraphs to your banker about financing for a llama ranch; circle the note; select the memo form; and watch as the PDA formats the note as a formal memo, complete with headers, footers, and a date.

Sound too good to be true? Heard one too many high-tech promises to believe this one? The truth is that this sophisticated series of interactions will rely on several ambitious hardware and software solutions to difficult problems, and it remains to be seen whether Apple's first products will live up to their promise.

I Have Seen the Future, and It's a Prototype

THE FIRST PDAS WILL BE SLIGHTLY larger than some of the electronic personal organizers already on the market. Each product will have an LCD display covered by a transparent tablet that the user will write on with a stylus. The writing will appear on the screen for a moment, then software will transform it into computer characters or graphics.

The large amount of computing power necessary to recognize and transform handwriting quickly will come from a RISC microprocessor from ARM, a company Apple has invested in. The ARM 610 processor, which should afford one to two times the power of a Mac IIx, according to Apple, is inexpensive, takes up little space, and consumes little power. Apple and ARM have also custom-designed a series of ASIC chips that will surround the processor, controlling the various hardware components and running the operating system and the closely-integrated application software.

Custom-developed ASICs will provide one of the keys to the Newton's small size. Custom-designed ASICs can provide more functionality in fewer chips and can

Other Pen-Based Computers

The first pen-based computers date back to about 1987, when a company called Linus produced a portable pen computer called the WriteTop. It ran MS-DOS, had an 8088 processor, weighed about 9 pounds, and was discontinued in 1989 because of the company's lack of funding. About that same time, GRiD introduced the GRiDPAD—a notebook computer designed mainly for filling out forms. GRiD is still producing notebook computers, and it currently ships the PenRight Operating System, which works on top of MS-DOS and supports many standard applications.

Industry spotlights are currently on GO's PenPoint and Microsoft's Windows for Pen Computing operating systems. Both of these systems are shipping, and several companies are producing hardware capable of running them. Like PenRight, both of these operating systems support standard applications.

Another company, Communications Intelligence Corporation (CIC), offers its PenDOS operating system, which runs on MS-DOS-based pen computers and supports multiple languages and a variety of applications. GeoWorks has recently announced a pen-based version of its Windows-like interface that runs on less powerful machines than does PenPoint or Windows. Xerox Imaging Systems has done considerable work in the area of pen-based X-Windows systems, and IBM has announced an intent to develop OS/2 for Pens. Momenta made a big splash with its lavish marketing campaigns but has made little headway in attracting buyers of its proprietary system.—JOHN WAGONER

Company	Computer	Operating System(s)	Availability	Approximate Price
Data Entry Systems	ScriptWriter II	proprietary	now	\$1500
The ScriptWriter is the only pen-based computer that uses simple paper forms placed on its digitizer surface. Translated text appears on an LCD at the top of the unit.				
DFM	Travelite	MS-DOS	now	\$3000
DFM initially developed this 286-based, touch-screen machine with sound capability for dietary food management. It uses a proprietary pen-aware DOS shell for all sorts of portable applications.				
GRiD	GRiDPAD RC, HD, and RF	PenRight	now	\$2500-\$4000
GRiD has the most machines in the field with its GRiDPAD series. They come in a variety of configurations and can include a hard drive, PCMCIA cards, or wireless connectivity options.				
GRiD	PalmPad	PenRight	summer 1992	\$2000
The newest addition to GRiD's pen lineup, the PalmPad is smaller, more rugged, and even more portable than GRiD's previous offerings.				
IBM	ThinkPad	PenPoint	summer 1992	\$5000
Big Blue's current pen offering is among the most rugged of the machines presented. Inside its magnesium case are a 386SL processor and 20MB of solid-state memory, which replaces the disk drive in a traditional notebook.				
Microslate	Datelite 300/400	PenDOS; PenPoint; Windows for Pen	now	\$4000-\$6000
Next to GRiD, Microslate has been producing pen-based computers the longest. Microslate currently offers Intel 80386 and 486 ruggedized pen-based systems for a number of vertical applications.				
Momenta	Pentop	MDE; PenWindows; Windows for Pen	now	\$3700
Well-funded but troubled Momenta entered the 386 pen-computer market with its Pentop computer, which was intended to bridge the gap between pens and keyboards for professionals. Former Apple executive Del Yocam recently picked up the reins at Momenta and has begun cutting costs and lowering product prices.				
NCR	3125	PenDOS; PenPoint; Windows for Pen	now	\$4700
One of the first lightweight, power-conscious Intel 80386SL tablets, the 3125 comes with either a hard drive or solid-state memory. A 1/2-inch-wide docking station provides parallel, serial, keyboard, and monitor ports.				
NEC	UltraLite SL/20P	PenDOS; PenPoint; Windows for Pen	now	\$3500
This NEC machine looks like a keyboard-based notebook computer, but it uses a pen instead of a mouse.				
PI Systems	Infolio	proprietary	summer 1992	\$2000
Unlike most of the other Intel-based tablet computers, the Infolio uses a low-power Motorola 68331 processor. The system has little internal memory, but relies on three PCMCIA card slots for data and program storage.				
Poqet	PoqetPad	PenDOS; PenRight	now	\$2000
The PoqetPad is among the smallest and lightest of the pen-based systems currently on the market. Its low-power technology gives it up to ten hours of battery life.				
TriGem	Pen386SX	PenDOS; PenPoint; Windows for Pen	summer 1992	\$4500
Developed in England, this machine features a high-contrast LCD, two PCMCIA memory card slots, and an extended digitizer area around the display.				
Tusk	Super All-Terrain	PenDOS; PenPoint; Windows for Pen	summer 1992	\$6000
Based on an Intel 80386SL and encased in a high-impact composite case, the All-Terrain boasts a large-capacity hard drive and detachable keyboard and base station.				

JOHN WAGONER is president of PenWorld, of San Francisco, which publishes *Pen* magazine.

take less space and power than standard chips. The microprocessor and the ASICs together should consume between 0.8 and 1 watt, Apple said.

A key to the Newton's low cost will be the tight coding of the system software. Apple intends to make the core operating system very small so it will require less hardware to run. The Newton will use many ROM chips because they cost less than RAM chips. The system will execute a higher percentage of instructions from the ROM rather than relying on high memory requirements to run.

A critical role in making Newton products customizable will be played by a PCMCIA slot. The slot will connect to a 32-bit, high-speed bus and accept credit card-size cards that will provide the PDA with memory or storage. Eventually, these cards will support additional processors, such as digital signal processors. PCMCIA is a relatively new standard for integrated circuit boards that's gaining acceptance.

The Newton will also contain a small speaker, which will provide audio cues about the actions Newton is performing. The first Newton product will not have a microphone or microphone jack for reasons of size and cost. Future products, especially those with speech recognition, will provide for a microphone.

The main interfaces on the first Newton models will be the PCMCIA slot, a standard Macintosh-style serial port, and a directional infrared device expected to communicate at 38.4 Kbps up to 6 feet away. Using the infrared connection, you will be able to transfer information to and from a Macintosh or other personal computer equipped with infrared capability and file-transfer software. You will also be able to use a modem to transfer data and applications between the PDA and personal computers.

An infrared device planned for the future will communicate at speeds faster than 38.4 Kbps and won't have to be aimed at the receiving device. Apple envisions a "roving" version of AppleTalk that will let you walk from room to room and be recognized by and connected to the network using this infrared device.

The Operating System

THE NEWTON'S OPERATING SYSTEM will have three main components: one for recognizing text and graphics drawn on the screen (the recognition component); one for organizing information into an object-oriented database (the information component); and one for communicating information to external devices via networks, modems, infrared file transfers, cellular telecommunications, or cabling (the communication module).

The recognition component will consist of several *recognizers*, software modules optimized to recognize a particular set of symbols or characters. Each recognizer will examine what has been written on the screen and pass what it deciphers to a controller that will coordinate the varied responses and make the best guess of what's correct based on the data's context and its position on the screen. Think of the process as a digital democracy in which each recognizer will cast a vote as to whether you've written a lowercase letter *L*, the number 1, or a vertical line; the controller will arbitrate, electing the character that makes the most sense.

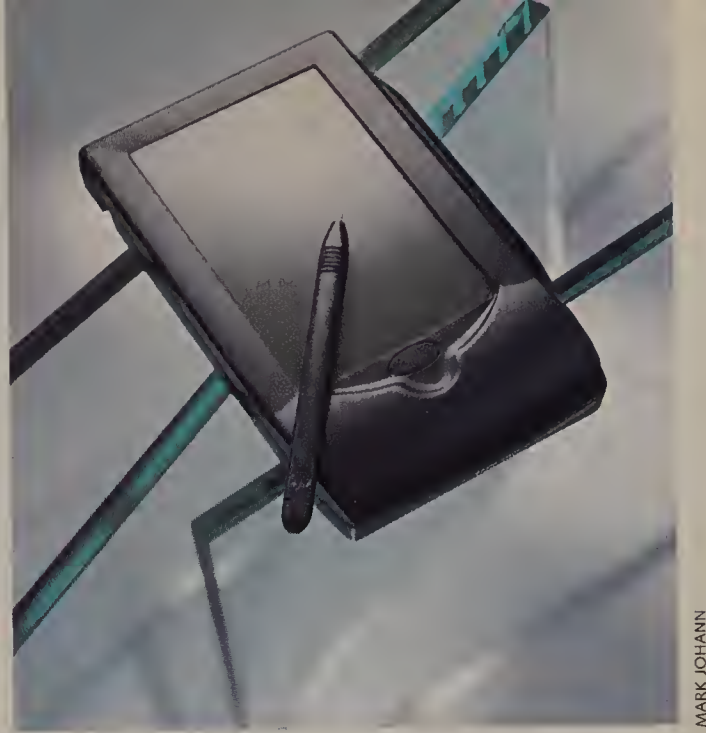
At the technology demonstration we saw before Apple's official announcement, the PDA could recognize printed block handwriting, and writing in small-size letters produced small text, while writing in large-size letters produced similarly large text sizes on the screen. We saw the demonstrator draw a circle, square, and polygon, and ask the system to smooth and render them accurately. Objects could also be left as drawn to preserve the rough feel of "ink" on "paper." We couldn't tell how long it took to recognize these samples, or how well the technology can learn to decipher idiosyncratic handwriting.

The first products will ship with three or four recognizers, but Apple will provide developer kits so that vendors can create recognizers for specific data, such as equations or Cyrillic characters. Initially, this system will recognize printing; in the future look for cursive recognition and the ability to write on an angle.

The system will also recognize a few common gestures as simple commands. The gestures are still undefined by Apple but are likely to include scrubbing out, to erase something written on the screen; drawing a caret, to insert a word in a line of text; and circling a phrase and tapping once, to ask the PDA to do something with the selected information, such as adding it to a to-do list or calendar.

The information component will capture recognized information and relate it to existing data in an intelligent way. The user will see information structured in forms that will look like the layouts of today's databases. An address book form might have space for names, addresses, and phone numbers, plus notes.

Information will not be stored in static fields; instead it will float around in a data soup of individual, tagged objects, ready to be retrieved in a variety of ways. Each object will have two parts: values and



MARK JOHANN

Open the cover and inside you'll see an LCD (covered by a transparent tablet) that you can write on with a stylus.

tags. Values will be the actual information in the object (John Q. Public, 1066, Istanbul). Tags will identify the type of information in the object (name, date, or city). As you enter information into this system, the PDA will link related types of information and related values. Any form will be able to access any of the entered data, so that, in theory, you'll have to enter any piece of data just once.

The PDA knows that Joan's birthday is associated with Joan's phone number, but you can retrieve each item independently. Once you enter Joan's name and address, any letter addressed to Joan can instantly contain her address or be faxed to her. If you have several Joans in the database, writing in "Dear Joan" can prompt a scrolling list of all Joans so that you can pick the correct one.

From Idea to Product Line

AS WE WRITE THIS ARTICLE, MANY specific product details are either undecided or undisclosed. We expect the first PDAs to offer the basic functionality outlined here, but subsequent ones will offer different screen sizes and orientations and expanded communications capabilities.

Apple plans to license the core PDA technology to third parties, like Sharp Electronics, which will develop and manufacture its own products. By licensing the technology, Apple hopes to help create a big market for these devices; by manufacturing its own PDAs, Apple hopes to keep control over that market and lead it in innovation and design.

Whatever the future may hold, it's clear that computers are about to jump off our desks and laps and into our pockets. We may not yet have effortless computing, but we're certainly getting closer to ubiquitous computing. In the future, there will be no excuse for forgetting a meeting or a lunch date, or losing a phone number. We can hardly wait. Honest. **m**

LOW CAPACITY

GETTING A HARD DRIVE WITH LOW CAPACITY MAY raise some eyebrows these days, since applications and data only grow in size. But for many people, a drive under 120MB is just the right size. For example, there's the first-time buyer who doesn't really know what to look for or where to start and is on a budget. Or there's the person who simply wants to add another drive to a system.

Users who know how to make the best use of storage, with optimizers and automatic file compression, may not want a huge drive. Other users benefit from having several small drives rather than one large one, since this configuration makes information more easily portable and lets you move storage resources to accommodate changing system needs in a multiple-Mac environment.

Macworld Lab tested 47 hard drives with capacities under 120MB. Almost all these drives use the Quantum LP105S (105MB) and the LP52S (52MB) mechanisms, so what distinguishes vendors? In a nutshell, the differences come down to three basic categories: special features, service and support, and value.

Most drive vendors are longtime players in the market and continue to offer good deals and good service. These vendors offer neither the cheapest nor the most expensive drives but do provide strong quality, service, and attention to detail. Drives from such vendors are typically sold through resellers, which can offer immediate and comprehensive service. However, many drives (even those sold through resellers) can be purchased directly from the vendors, for a better price, without much loss of service. "Hard Drive Details" shows which sales methods each drive company uses.

Macworld Lab
tests 47
drives that store
less than
120MB, including
some that
fit in the palm of
your hand

BY ERICA SANDSTEDT

HARD DRIVES



The new 2½-inch drive mechanisms from vendors like Quantum have made possible smaller, lighter, and faster hard drives and set the stage for a wave of new portable drives.

Drives to Go

THE POPULARITY OF THE MACINTOSH PowerBook has popularized the portable drive—a lightweight, small device that you can treat like a high-capacity floppy. With a portable drive, you can carry a whole business plan around the world in your pocket. A portable drive no bigger than a Sony Walkman can be a solution to those who need such freedom.

More and more drives in the under-120MB range are portables, meant to be used for demos, sales calls, and the like. The portables Macworld Lab tested include the Mass Microsystems HitchHiker 40MB; Liberty Systems Liberty 50 52 and Liberty 50 105Q; Mirror Technologies Mirror 50MB External and 105MB External (also sold by Mirror's sister company, Generation Systems); and Vision Logic MacPocket 40MB.

The best portable drives reviewed are the 52MB and 105MB portables from Liberty Systems. They come with AC/DC switchable power supplies and are very compact—small enough to fit in a jacket pocket. (A carrying case is also available as an option.)

For travelers in both the Mac and DOS worlds, Liberty offers a special controller board and formatter utility (Formatter 5 from Software Architect) that can format Liberty drives with both Mac and DOS partitions. Drives formatted this way can be accessed on Macs and on DOS PCs that have a SCSI board.

Portable drives are quieter than drives intended to stay on your desk because portables have no cooling fans or power supplies. Portables draw their power from

the Mac's SCSI ports to save space (so no power supply is needed) and be fully transportable. Although using a portable drive with a PowerBook shortens the PowerBook's battery life, the convenience of sufficient storage on the go makes this trade-off more than worthwhile. And careful battery management can stem the power loss (invoking the PowerBook's sleep mode, so an inactive drive will stop spinning after, say, a minute). Some portable drives, such as Liberty's, support optional power supplies.

Performance Issues

WHETHER YOU ARE SEEKING A PORTABLE or desktop drive, it's easy to let speed become the primary criterion for choosing a drive. But it doesn't make sense to put too much faith in raw speed. If you have a Mac Classic, there is little point in picking a hard drive based on Macworld Lab test results of disk-access speed, since the Classic's slow processor (8MHz 68000) and SCSI interface keep the Classic from transferring data as fast as even the slowest drive can handle. But if you are working on a Mac Quadra 700 or 900 with a 25MHz 68040 processor, you may want one of the drives with the fastest access times, such as the PLI PL105 Turbo or the Total Peripherals Q105X. The



The Mirror 105MB External desktop hard drive (left) and Mass Microsystems HitchHiker 40MB portable drive (right) were two of several products that offer strong performance, good price, and valuable support.

MacTel and Mirror M100 drives are also suitable for use with faster processors.

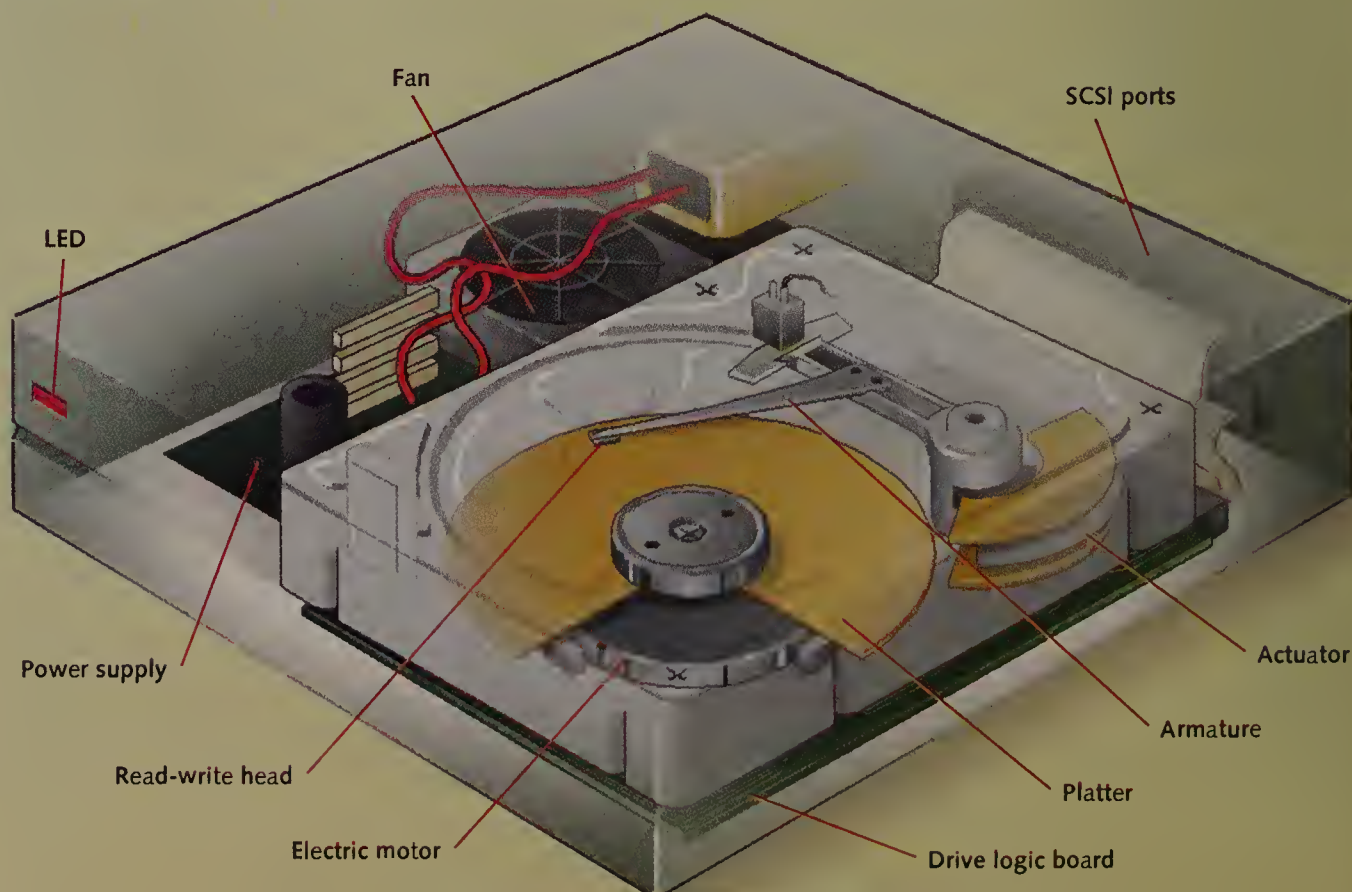
No matter what kind of Mac you use, if you connect more than one hard drive to it, you'll find that none of the drives can go faster than the start-up drive.

Vendors often advertise a drive's average access time, which represents how long it takes for the drive to position its head over a data sector on the disk and transfer one block of data from the drive. Speeds of under 25 milliseconds are fine for most 16MHz and slower Macs; speeds of under 20ms are fine for faster Macs.

Macworld Lab tested the drives two ways: using a collection of real-world activities (such as copying a large folder, seeking multiple records from a database, and writing a large file to the disk); and using a benchmark program to measure raw access speed. The real-world tests reflect the performance a user sees and take advantage of any speed enhancements,

Inside a Hard Drive

Several key components dictate how well a drive performs. The platter stores the information, and the denser the platter's storage capabilities, the more data can be stored and the faster a drive can read and write data (since the bits of data are closer together). The read-write head uses magnetic signals as does a tape recorder. The head skims over the platter, a few millionths of an inch above the surface, writing magnetic spots with either positive polarity or negative polarity. When it reads, the head senses whether polarity changes between spots; if it does, the logic board that controls the head interprets that bit of data as a 1; otherwise, it interprets that bit as a 0. This binary sequence of 1s and 0s is then interpreted by the drive software on the Mac as files and other discrete data. The drive's logic board also controls the SCSI connectors (through which data enters and leaves the drive), the spindle (which spins the platter), and the drive armature (which positions the read-write head).



such as a cache that the vendor puts in the drive. The raw speed tests factor out such enhancements to show the mechanism's innate capabilities.

Generally, we found that drives using a Quantum mechanism are the fastest. Drives using a Maxtor mechanism place second as a group, giving acceptable if not exciting performance. Other mechanisms are noticeably slower. The ROM version for each type of mechanism has no noticeable effect on performance, so don't worry about whether or not your drive has the absolute latest ROM version.

Disk speed is not solely a function of the hardware—the formatting software makes a difference as well. For example, the speed difference between the fastest drives (from PLI and Total Peripherals) and other drives using the same mechanism was caused by the formatting software. The difference in disk speed can be as much as 10 percent.

In its tests for noise, Macworld Lab

found that the quietest drive for desktop use is the MacTel HD Index 52, at 33.1 decibels, while the Rodime Cobra 45e, 80e, and 100e were the loudest, at 47.6dB to 49.9dB. Others that were louder than 45dB include the Apple 80SC, PLI 52MB External Mini Drive and PL 105 Turbo, Relax Vista 46 and Relax 80 Plus, and Ehman HD60S. Readings of about 35dB are audible; at about 45dB, the noise becomes annoying. Many drives had readings in the 34dB-to-40dB range.

Macworld Lab found that the drives using Quantum mechanisms generally did best on speed and noise tests, which explains why Quantum-based drives account for the lion's share of the market—more than three-quarters of the drives tested.

Bundled Software

SOME OF THE BETTER DRIVES INCLUDE more than just the typical formatting and diagnostic software. While every vendor offers partitioning software, not everyone

has a backup or disk-repair utility. Those who do (such as GCC, PCPC, and Rodime) have been in business for some time and know the value their customers get from these utilities. The best backup software was PCPC's demo copy of its Netstream, which allows an incremental backup from any type of media to any type of media. Although it's only a demo copy, it has all that a single user needs; those in a networked environment will want the full program.

Not all backup programs are created equal. A good backup program is fast; compresses data; lets you back up to a variety of media (like tape drives, Bernoulli Boxes, and CD ROM drives); and lets you back up files incrementally (backing up only the files that weren't backed up earlier). The backup utility that comes with Macs offers none of this.

Partitioning divides a hard drive into separate areas, called *volumes*, each represented by a separate icon. Each volume

How Helpful Is the Help?

To someone having a problem with a product, a company's technical support can save the day or be the straw that breaks the camel's back. *Macworld* evaluated the technical support offered by vendors of low-capacity drives by calling each one three times posing as a customer. We devised three questions that could apply to all the drives and that had known answers. The scores, which we calculated according to a point system, are listed in the last column of the "Hard Drive Details" table.

Technical support ranged from excellent to poor, technicians from supportive to combative, and service from eager to indifferent. Our point system awards or subtracts a certain number of points in three categories—accuracy, helpfulness, and accessibility—based on the response (or lack of response). For example, to get the most points possible, a company must answer the calls promptly (no busy signals or long ring times), not put customers on hold, take charge in helping the user identify the symptoms and system configuration, provide a correct answer, and be polite. Points awarded are less if, for example, the technician didn't ask questions of the user to get the configuration information needed to diagnose the problem. If the response hinders the user—for example, a wrong answer, long periods on hold, late call-backs, or rudeness—points are subtracted. Ultimately, the total is matched to scores of excellent, very good, good, satisfactory, and poor.

In general, we found support to be good. For example, at Relax Technology, the three support technicians were all courteous. They also gauged our caller's level of knowledge and immediately began asking the right kinds of questions to get the information they needed to diagnose our problem. As our caller reported: "When I posed as a naive user, the technician handling the call knew immediately that I was a bonehead and got right to the problem. 'Let's try something,' he said, leading me right to the problem."

Better support technicians went a step beyond diagnosing the problem at hand—they educated us to prevent future problems. For example, when answering a SCSI-termination question, a technician at Alliance Peripheral Systems "explained, clearly, the perils of termination and what to look out for," our caller reported. We had similar responsiveness from technicians at Mirror Tech-

nologies, Mass Microsystems, and Optima Technology.

The better technicians are also patient. For example, after our caller spoke with the technicians at Liberty Systems, he reported, "One offered suggestions when I seemed hesitant, without cutting me off." But patience is not a universal virtue. For example, when our caller played the role of naive user when asking about SCSI IDS, the technician at FWB solved the problem but got exasperated. "He solved my problem but kept telling me to read the manual."

Correct answers, courteous treatment, and helpfulness are hallmarks of good support—but if you can't get through to support, they do you no good.

For some companies, getting through is the problem because support centers are overwhelmed. When calling PLI, for example, our caller was on hold for 23 minutes. When our caller complained, the technician growled back, "Oh, I've been on the phone for three hours!"

Other companies have customers leave messages rather than stay on hold. But that introduces problems of its own. For example, one message left with La Cie's support lines went unanswered for four business days; one to Relax's for three days. Fortunately, the other times we called these companies, our caller got through easily and was helped promptly. An extreme case was PCPC, which never returned two of our three calls. At best, leaving a message usually means waiting a full day until you get a response.

When you do get a response, you likely have forgotten all the details the technician wants. Sometimes, if you're particularly unlucky, you get an ego-deflating response like the following from a technician at Rodime Systems: "Do you still need help? You probably got it worked it by now, right?"

And some companies make you go to your dealer—who may or may not be up to speed on the product. Apple has a strict "see your dealer" policy. FWB tells customers to call their dealers first. But when our caller said his dealer went out of business, he did get competent, friendly help from FWB.

Technical support is a crucial part of a product purchase. Fortunately, most companies recognize this and offer reasonable support. The horror stories here are the exceptions, but they are not rarities.

—GALEN GRUMAN AND GEORGE REYNOLDS

HARD DRIVE DETAILS

Company	Product Line	20-40MB Drives (Capacity/Mech- anism/Price)	50-80MB Drives (Capacity/Mech- anism/Price)	90-115MB Drives (Capacity/Mech- anism/Price)	Method of Sales	Termination	Backup Software
Alliance Peripheral Systems	APS	○	52MB/Q/\$299	105MB/Q/\$449	direct	external	○
Apple Computer	Apple Hard Disk	○	80MB/Q/\$1099	○	dealer	external	○
Core International	Mac-Sop	○	80MB/M/\$795	○	direct/dealer	external	●
DJK Development	MS	○	80MB/M/\$439	○	direct	external	●
Ehman ⁴	Ehman	20MB/S/\$239	52MB/Q/\$379; 60MB/S/\$319; 80MB/S/\$349	○	direct	internal	○
	Ehman	○	60MB/M/\$369; 80MB/S/\$419	105MB/Q/\$509	direct	external	○
ETC Peripherals	ETC DataDrive	○	52MB/Q/\$299; 80MB/M/\$359	○	dealer	internal	○
FWB	PocketHammer ⁶	○	52MB/Q/\$659	105MB/Q/\$869	dealer	external	○
GCC Technologies	UltraDrive	20MB/S/\$419	52MB/Q/\$549; 80MB/S/\$569	105MB/Q/\$739	direct/dealer	external	●
Generation Systems	External	○	50MB/Q/\$685; 60MB/S/\$655	100MB/Q/\$915	dealer	external	○
	Portable ⁶	○	52MB/Q/\$725; 60MB/S/\$675	105MB/Q/\$945	dealer	external	○
La Cie	Cirrus, Tsunami, ZFP	40MB/Q/\$499	52MB/Q/\$339; 80MB/Q/\$649	105MB/C/\$479	direct/dealer	external	○
	PocketDrive ⁶	40MB/Q/\$499	80MB/Q/\$649	○	direct	external	○
Liberty Systems	Liberty ⁶	○	60MB/C/\$599	52MB/Q/\$699; 105MB/Q/\$899	direct/dealer	switchable	○
MacLand	MacLand	○	52MB/Q/\$299	○	direct	internal	○
MacTel Technology Corporation	HD Index	○	52MB/Q/\$259	○	direct/dealer	external	○
Mass Microsystems	DiamondDrive Portable ⁶	○	80MB/M/\$539	○	dealer	external	○
	HitchHiker ⁶	40MB/Q/\$599; 40MB/JVC/\$599	80MB/Q/\$899	○	dealer	internal	○
Mega Drive Systems	M1	○	52MB/Q/\$559	105MB/Q/\$769	direct/dealer	external	●
	XM	○	52MB/Q/\$594	105MB/Q/\$804	direct/dealer	external	●
Microtech International	Nova	○	52MB/Q/\$649	105MB/Q/\$1099	dealer	external	○
	Athena Portable ⁶	○	52MB/Q/\$988	105MB/Q/\$1688	dealer	external	○
Mirror Technologies	External	○	50MB/Q/\$349; 60MB/S/\$339	105MB/Q/\$479	direct	external	○
	Portable ⁶	○	52MB/Q/\$329; 60MB/S/\$349	105MB/Q/\$449	direct	external	○
Optima Technology	MiniPak	○	60MB/M/\$649	○	dealer	external	○
PCPC	MacBottom	○	52MB/Q/\$449	105MB/Q/\$514	direct/dealer	internal	●
PLI	PL Turbo	○	52MB/Q/\$599	105MB/Q/\$799	direct/dealer	switchable	●
Procom Technology	MD series	○	52MB/Q/\$599	105MB/Q/\$799	dealer	external	○
Relax Technology	Plus	○	80MB/M/\$369	○	direct	external	○
	Sierra	○	60MB/M/\$269	○	direct	external	○
	Vista	20MB/S/\$199	46MB/S/\$279; 52MB/Q/\$289	90MB/F/\$359; 105MB/Q/\$409	direct	external	○
Rodime Systems	Cobra	45MB/Q/\$559	80MB/M/\$839	105MB/Q/\$889	dealer	external	●
Total Peripherals	QX Compact	○	52MB/Q/\$429	105MB/Q/\$629	dealer	internal	○
	QX	○	52MB/Q/\$429	105MB/Q/\$629	dealer	internal	○
Vision Logic	MacPocket ⁶	40MB/C/\$470	○	○	direct/dealer	internal	○
	Power Mac	40MB/C/\$599	○	○	direct/dealer	internal	○

● = yes; ○ = no. C = Conner Peripherals, F = Fujitsu, JVC = JVC, M = Maxtor, Q = Quantum Corporation, S = Seagate Technology. ¹ Some drives not fully compliant with FCC regulations. ² Not offered; must ask dealer. ³ Class A (business use only). ⁴ Ehman has recently sold its product line to a new company; see Conspicuous Consumer, in this issue, for

can be password-protected, encrypted, or given its own System Folder for running under a different System version or under Apple's A/UX version of the Unix operating system. In effect, each volume functions and looks like a separate hard drive.

Partitioning software that subdivides one drive is not often used, especially on low-capacity drives where the need to create multiple, small volumes is rare. But another type of partitioning software can add value to a low-capacity drive. For example, ETC Peripherals' tools include the

Super Volume utility, which enable you to combine two or more hard drives as one volume. Its user interface is simple, intuitive, and at the same time very comprehensive.

One of the best software packages to be bundled with a drive is FWB's Hard Disk Tool Kit. Another good package, MacTools Deluxe, is bundled with the GCC and Rodime drives; they also include their own utility program. MacTools Deluxe is easy to use, although its interface is not as friendly as ETC's. Its

manual is better written, but this all-encompassing utility can be confusing for inexperienced users because it has so many options.

Ehman's drives include DiskDoubler and MacTree, two powerful and extremely useful tools for small-capacity drives. DiskDoubler automatically compresses files, freeing as much as half the space on a hard drive. And PLI bundles its own Turbo Optimizer software, which is not as powerful as DiskDoubler, but it is just as useful as DiskDoubler for opti-

Other Bundled Commercial Software	Password Protection	FCC Certification	Money-Back Guarantee (in months)	Warranty (in months)	Extended Warranty	Toll-Free Tech Support	Repair Turn- around Time (in days)	Data Recovery on Request	On-Line Tech Support	Tech Support
○	●	● ¹	1	24	○	●	2	for a fee	○	very good
○	○	●	none	12	●	○	7	○	○	²
SUM II; SAM	●	● ³	none	24	○	●	2	○	●	good
○	●	●	none	12	○	○	7-10	at no cost	○	good
DiskDoubler; MacTree	●	●	1	12 ⁵	○	●	3	for a fee	○	very good
DiskDoubler; MacTree	●	●	1	12 ⁵	○	●	3	for a fee	○	good
ETC Tools	●	●	none	12	○	●	2	for a fee	●	good
Hard Disk Tool Kit	●	●	none	24	○	○	2	at no cost	●	satisfactory
MacTools Deluxe; Quick Envelope; shareware	●	●	none ⁷	24	●	●	2	at no cost	●	satisfactory
○	●	●	none	12	○	●	2	for a fee	●	satisfactory
○	●	●	none	12	○	●	2	for a fee	●	satisfactory
○	●	●	none	24	●	●	3	for a fee	●	satisfactory
○	●	●	none	24	●	●	3	for a fee	●	satisfactory
○	○	●	1	12	○ ⁸	○	2	for a fee	●	satisfactory
○	●	● ¹	1	24	●	○	2	at no cost	○	satisfactory
public domain	○	○ ⁹	1	24	○	●	2	○	○	satisfactory
SuperDisk; PadLok	●	○ ⁹	none	24	●	●	5	○	●	satisfactory
SuperDisk; PadLok	●	○ ⁹	none	12	●	●	5	○	●	satisfactory
○	●	●	1	12	●	●	2	for a fee	●	satisfactory
○	●	●	1	12	●	●	2	for a fee	●	satisfactory
Norton Utilities	○	¹⁰	1	60	○	●	2	at no cost	●	¹⁰
Norton Utilities	○	¹⁰	1	60	○	●	2	at no cost	●	¹⁰
Gofer; Inside Info	●	●	1	24	○	○	2	for a fee	●	good
Gofer; Inside Info	●	●	1	24	○	○	2	for a fee	●	good
DiskMount	●	●	1	12	●	○	1	at no cost	●	satisfactory
○	○	●	none	24	●	●	5	for a fee	●	very good
Turbo Optimizer; Turbo Cache	○	○ ⁹	1	24	●	●	2	at no cost	●	satisfactory
○	●	●	none	24	●	●	2	○	●	²
SCSI Probe	○	○ ⁹	1	12	○	○	2	○	○	satisfactory
SCSI Probe	○	○ ⁹	1	12	○	○	2	○	○	satisfactory
SCSI Probe	○	● ¹	1	12 ¹¹	○	○	2	○	○	satisfactory
MacTools Deluxe	●	●	none	24	○	●	3	for a fee	○	satisfactory
○	●	●	none	24	○	○	3	at no cost	○	poor
○	●	●	none	24	○	○	3	at no cost	○	poor
○	○	○ ⁹	1	12	○	○	7	○	○	poor
○	○	○ ⁹	1	12	○	○	7	○	○	poor

details. ⁵ 24 months for 80MB drives. ⁶ Portable drives: price includes power supply. ⁷ Unless purchased directly from GCC. ⁸ Customers who buy a carrying case get a 12-month extended warranty. ⁹ Certification pending. ¹⁰ Could not check because Microtech refused to provide products for review. ¹¹ 24 months for Quantum-based drives.

mizing and defragmenting files before shutting down. (Defragmentation keeps the data that makes up a file in a contiguous area of the disk, thereby making file access faster.)

Several vendors include shareware on their drives. Although this may seem like a good idea at first, it is soon frustrating to find that 5MB or more on your new drive are filled with advertisements and games that you don't want. This extraneous, unwanted material can also confuse newer users who are faced with an array

of files and folders that they may not realize can be removed with no harm.

SCSI Termination

CONNECT MORE THAN A FEW SCSI devices and you're bound to run into a few problems. How the devices are terminated, the order in which they are hooked together, the SCSI ID number assigned to each device, and the total length of the cable connecting them—all these factors play a role in whether a system functions properly.

When adding hard drives or other SCSI devices, knowing a couple of basic facts can make the difference between frustration and success.

First, all SCSI devices have a unique number, called a SCSI ID. The devices have a push-button, dial, or DIP switch to set the SCSI ID number. ID 0 is reserved for the Mac's internal hard drive; other devices can use any number from 1 to 6; no two devices can use the same number. The Mac recognizes devices with higher-value IDs (like 6 and 7) before those with

Hard Drive Speed and Noise Tests

20MB to 115MB

Color Key

Fastest

Speed compared to fastest

90-99%
80-89%
70-79%
0-69%

The drives are listed from best overall performance (top) to worst overall performance (bottom), based on both application and low-level SCSI tests. To the left of the product names are codes indicating the manufacturer of the mechanism the drive uses. The key below explains the codes.

For application tests, we measured each drive's ability to duplicate a 3.2MB file and a 10MB folder and search a database for a specific record. We also averaged the drive's speeds for opening and saving files from several applications, including PageMaker and Photoshop. All the tests represent real-world tasks.

Mechanism Key

C = Conner
JVC = JVC
M = Maxtor
Q = Quantum
S = Seagate

* Company uses drive mechanisms from more than one manufacturer; code indicates manufacturer of the mechanism in tested unit.
** Company now uses a Quantum mechanism.

Overall Fastest	
Q	PLI PL105 Turbo
Q	Total Peripherals Q105X
Q	APS External 105MB
Q	La Cie Tsunami 100MB
Q	Mirror 105MB External
Q	MacTel HD Index 100
Q*	Liberty Systems Liberty 50 105Q
Q	Rodime Cobra 100e
Q	FWB PocketHammer 100
Q	Generation Systems 105MB Portable
Q	GCC Technologies UltraDrive 100S
Q	Generation Systems 100MB External
Q	Total Peripherals Q52X
Q	Relax Vista 52
Q	Procom Technology MD50
Q	PLI 105MB External Mini Drive
Q	CMS 105MB
Q*	La Cie Tsunami 50MB
Q	Rodime Cobra 45e
Q	FWB PocketHammer 50
Q	Liberty Systems Liberty 50 52
Q	PLI 52MB External Mini Drive
Q	Mirror 50MB External
Q	PLI PL52 Turbo
Q	APS Portable Q52
Q	PCPC MacBottom 52MB
Q	MacLand 52MB External
Q	GCC Technologies UltraDrive 50S
Q	MacTel HD Index 52
Q	Generation Systems 52MB Portable
M	Relax Sierra 60
M	Optima MiniPak 60
M	Core Mac-Sop 80
Q	Generation Systems 50MB External
M*	Rodime Cobra 80e
M	Relax 80 Plus
M	Ehman HD80MS
M	DJK Development MS-80
M	Mass Microsystems DiamondDrive 80P
C	Vision Logic MacPocket 40MB
S	GCC Technologies UltraDrive 80
S	Ehman HD60S
JVC**	Mass Microsystems HitchHiker 40MB
S	GCC Technologies UltraDrive 20
S	GCC Technologies UltraDrive 45
Q	Apple Computer 80SC
S	Relax Vista 46

Overall Slowest

Duplicate (in seconds)	Open (in seconds)	Save (in seconds)	Search (in seconds)	Compile (in seconds)	SCSI Evaluator Read (in MBps)	SCSI Evaluator Write (in MBps)	Noise (in dB)
49.0	35.4	62.6	31.5	29.2	1.11	1.12	47.5
50.6	37.6	58.6	31.2	29.0	1.11	1.12	44.7
51.3	37.7	60.0	30.9	29.2	1.10	1.11	38.9
52.8	38.1	59.4	30.7	28.9	1.11	1.11	43.1
50.1	37.3	59.1	30.5	29.0	1.10	1.00	30.8
50.2	36.8	58.9	30.9	28.9	1.10	1.00	36.6
50.8	38.4	60.2	31.1	29.2	1.09	1.09	35.9
54.5	37.0	58.9	30.5	30.0	1.10	1.11	47.6
50.5	38.4	58.7	30.3	28.6	1.04	1.05	39.1
50.0	38.0	57.4	30.6	29.4	1.09	0.98	30.4
58.1	36.9	57.6	30.9	28.7	1.09	1.10	40.3
48.8	36.8	58.7	30.2	28.5	1.00	0.91	43.5
54.1	39.2	63.7	31.0	30.1	1.07	1.08	43.5
57.7	37.9	62.7	30.9	30.3	1.08	1.08	43.6
55.1	39.0	63.5	30.2	30.1	1.05	1.04	34.4
51.5	37.8	65.4	32.0	30.0	1.02	1.03	41.0
53.3	41.6	61.5	34.7	30.5	1.12	1.12	45.1
57.3	38.3	62.1	30.8	30.5	1.06	1.06	41.6
57.6	38.5	63.9	30.7	30.5	1.07	1.07	48.9
54.0	40.4	63.6	30.4	29.9	1.02	1.05	38.5
55.0	39.4	64.6	31.0	30.4	1.05	1.06	38.0
54.3	37.5	69.2	31.9	30.9	1.06	1.07	47.4
53.7	39.1	63.1	30.8	30.1	1.06	0.96	44.4
54.4	37.5	69.5	32.5	30.9	1.06	1.07	41.2
56.2	39.7	65.2	31.2	30.3	1.04	1.05	40.5
54.7	39.2	63.6	30.6	30.0	1.04	0.95	37.8
55.2	39.7	65.0	31.3	30.8	1.04	1.03	39.4
60.7	39.9	63.8	31.0	30.3	1.06	1.06	39.9
55.0	40.7	63.9	30.9	30.3	1.04	0.94	33.1
54.9	39.6	64.3	31.2	30.8	0.79	0.74	29.8
57.1	38.7	71.1	38.3	32.4	0.88	0.89	35.7
58.3	40.4	70.4	37.7	31.8	0.88	0.89	44.8
54.4	38.7	70.1	35.0	30.7	0.77	0.78	48.5
57.2	41.6	67.1	31.4	31.1	0.77	0.72	44.4
55.2	39.1	71.2	35.8	31.6	0.77	0.77	49.9
56.7	39.2	70.7	36.5	31.2	0.77	0.78	45.2
55.5	39.2	71.2	35.7	31.1	0.77	0.72	44.7
57.3	40.5	70.9	35.8	32.6	0.78	0.79	39.9
57.0	40.5	70.9	35.8	31.6	0.77	0.72	38.9
71.7	48.9	82.7	40.8	35.1	0.52	0.53	37.9
72.0	52.3	83.5	48.2	38.5	0.62	0.62	40.5
74.2	53.5	87.5	46.6	38.9	0.73	0.46	46.1
72.0	50.6	91.4	43.3	39.1	0.54	0.52	34.0
74.1	54.6	87.5	47.2	38.9	0.57	0.57	42.6
77.6	55.7	93.6	46.8	41.2	0.61	0.61	41.8
76.1	54.2	86.7	52.2	39.2	0.60	0.56	45.1
79.4	56.3	99.1	51.2	42.0	0.61	0.61	45.3

How Drive Mechanisms Compare

Performance differences between different companies' mechanisms are usually much greater than performance differences within mechanisms. These results show the range of results for the products tested by Macworld Lab.

Maxtor 7060SCS (60MB)
Maxtor 7080SCS (80MB)
Quantum LP105S (105MB)
Quantum LP52S (52MB)
Seagate ST138N (20MB)
Seagate ST157N (45MB)



Longer bars are better. Measurements are in percentages compared to the fastest (100).

FCC Certification Issues

Much ado has been made lately about FCC certification, with government agents sweeping trade shows to find violators. To be sold legally in the United States, computer equipment must be certified by a testing laboratory; the equipment must not exceed the Federal Communications Commission's standards for radio-frequency emissions. If it exceeds the standards, it may disrupt phones, radio transmissions, and other communications services.

There are two classes of certification: Class A for business use and Class B for home use; devices certified for home use are automatically certified for business use, where the emissions standards are less strict. Of the drives we tested, only Core International's was not certified for home use.

Macworld checked each drive's certification number (required for Class B products) against the FCC's centralized database. "Hard Drive Details" lists the certification status for the evaluation units we received from each vendor. A few vendors had begun shipping their drives while awaiting FCC certification; this is technically illegal and

could subject companies to fines. By the time you read this, their FCC certifications should be approved.

The regulations governing FCC certification are complex, which confuses some vendors and sometimes the FCC. For example, several vendors have certified their products but did not imprint the numbers on their drives—a technical violation of the FCC rules. Still other vendors used another company's certification, which is legal only if the vendor made no modifications to the original certified product—but it was impossible for us to know if an illicit change had occurred. We also came across one vendor—Relax Technology—whose 60MB Sierra portable drive didn't have a certification number because of debate over whether a drive that draws power from a SCSI port (as the Sierra does) need be certified at all. The FCC's chief enforcement officer said certification is required because the cable connecting the drive to the Mac emits radio frequencies as the power goes through it. *Macworld* will continue to research the issues surrounding FCC certification.—GALEN GRUMAN

lower-value IDs (like 1 and 2). (ID 0 is an exception: it is assigned to the start-up device.) This is important because only one SCSI device at a time can be in active communication. If SCSI IDs conflict, no device using that ID is likely to mount and may prevent system start-up. The SCSI IDs do not have to be in the same order as the devices are physically connected along the SCSI chain, but keeping them in the same order minimizes confusion.

Second, the first and last devices on a SCSI chain must be terminated so the signals and voltages across the chain remain stable. Most devices have a special termination connector that plugs into the outside of the box, but a few still use a jumper setting inside the device that requires dealer handling. Companies whose drives are terminated internally include four of Ehman's six drives in this range, ETC Peripherals' DataDrives, Mass Microsystems' HitchHiker 52, MacLand's 52MB drive, PCPC's MacBottom line, Total Peripherals' drives, and Vision Logic's drives. For portable drives like the HitchHiker and Vision Logic MacPocket, internal termination is acceptable, since chances are the only other SCSI device you'll use is the Mac's internal hard drive. But avoid desktop drives that are internally terminated; if you have one, use it as the last device on your chain.

To help you know whether your drive is properly terminated, Optima Technology uses a termination indicator light on its MiniPak 60 so you can see if the drive has been properly terminated. This is a handy feature; other vendors would do well to copy.

To set the SCSI ID, most portables use a dial, since it saves space. But a new user may not recognize the dial as the mechanism to set the ID. And with a small dial you may need a small screwdriver to change the ID.

Third, the total length of a SCSI chain has a limit beyond which the signals traveling along it begin to deteriorate, making devices unreliable. A realistic and safe guideline is 3 meters (about 10 feet), even though the Apple SCSI specification allows 6 meters.

Support Issues

MOST COMPANIES WHOSE PRODUCTS we evaluate here have been in the Macintosh drive market for five years or longer, and several companies that have been in the Macintosh market for less time than that have been in the general drive business longer.

A few companies—Alliance Peripheral Systems, ETC Peripherals, GCC Technologies, PCPC, and PLI—offer technical support through their own bulletin boards or through services like CompuServe, America Online, and

GENie. And all of them are pretty good about answering questions through the BBS, according to a check of their boards.

The quality of documentation varies widely. The best manuals not only explain how to install the hard drive and how to use its software but also teach users about the drive's mechanics and operations. FWB's manual is the most comprehensive. GCC's manual is well done for the new user, thanks to its simplified explanations and well-thought-out graphics.

Macworld called all the companies' technical-support lines, posing as a customer, to gauge technical support. Most technicians were knowledgeable, but our caller did get some unhelpful responses (see "How Helpful Is the Help?").

The Best Deals

IF YOU ARE BARGAIN HUNTING, ETC Peripherals and APS offer an unbeatable \$299 price for their 52MB portables. Both companies' portables have decent speed, are quiet, and come with good technical support. The GCC line is a little costlier but offers better support services. PLI and PCPC charge moderate prices but provide excellent service.

Whether you are a new consumer or an experienced user, the best drive for you depends on your needs. Price plays a major role, as do bundled software and support. If portability is important, pay the extra cost. If you are experienced and are confident that you won't need technical support, don't pay more for service you won't use. If you are inexperienced, pay the extra money for the help. **m**

See *Where to Buy* for contact information.

ERICA SANDSTEDT is an independent computer consultant and technical-support specialist.

Macworld Lab testing supervised by TIM WARNER.

MW EDITORS' CHOICE

Desktop Drives

APS External 105MB In terms of price per megabyte, this is the best deal. You also get good, fast service and technical support.

Company: Alliance Peripheral Systems.

List price: \$449.

Mirror 105MB External This speedy drive offers a good price and good support. **Company:** Mirror Technologies. **List price:** \$479.

Portable Drives

Liberty 50 105Q Well-designed and small, this drive is the best in its class for portability.

Company: Liberty Systems. **List price:** \$899.

TEN TIPS TO HELP
YOU MAKE THE
RIGHT CONNECTION

How to Buy a

MMO



THESE DAYS, SHOPPING FOR A MODEM CAN BE A much more daunting process than actually using one. Walk into any large computer store and you're faced with a bewildering array of modem products, protocols, and promises. Do you need the 24/96 send-and-receive fax modem for \$250 or the 2400-bps model with send-only fax for \$150? Should you invest \$400 in the 9600 V.32/V.42bis modem with MNP 5 data compression and error correction but no fax capabilities? And what exactly is modem voice messaging, and why would you need such a thing?

Despite all the product choices and alphabet-soup acronyms, shopping for a modem doesn't have to be an ordeal. All you need is a basic understanding of modem protocols and standards, a clear sense of your telecommunications needs, and the ability to recognize marketing hype when you see it. To help you on your way toward making an intelligent buying decision, I have come up with some practical modem-buying tips, along with a glossary (see "Modem Talk").

What's a Modem, Anyway?

THE WORD *MODEM* IS ACTUALLY AN ACRONYM for MODulator/DEModulator; a modem modulates, or converts, the digital signal from a computer into an analog signal (a series of tones and other sounds) that can be sent over a phone line. A modem on the receiving end demodulates the analog signal back into a digital form that the recipient computer can understand.

Modems transmit data at standard speeds; these speeds are expressed in bits-per-second (*bps*), or in a measure called a *baud rate* (see "Modem Talk" for a definition of these, and other, modem terms, which are italicized in the text). Technically, *bps* and *baud* are different, but the use of *baud* in place of *bps* is so widespread that the terms have become interchangeable.

With *bps* speeds, generally speaking, the faster the better. For example, the process of sending a 300K file over a 2400-bps modem takes roughly 22 minutes. With a 9600-bps modem, the file zips through the lines in only 5½ minutes. The advantage of a faster modem is even greater if you're downloading, or receiving, a file or other information from a commercial online service such as CompuServe or

America Online. Because these services charge for each online minute, time is literally money; the faster you work while online, the cheaper it is for you.

TIP 1 Buy the fastest modem you can reasonably afford; in the long run, it will save you money in toll calls and online usage fees. In the current market, unless you're on a restrictive budget, consider shopping for 9600-bps data modems, which sell for anywhere from \$230 to \$1100. Not all 9600-bps modems are created equal, though—the better models boast features that make communicating faster and more convenient, without adding much to the cost of the modem (see "Tip 7" for an example).

Setting Standards

WITHOUT COMMUNICATIONS *STANDARDS*, YOU risk creating a digital Tower of Babel with no modem being able to talk intelligibly with another modem. In the past each modem manufacturer had its own scheme to squeeze more speed out of its modems. Few, if any, of these schemes were *compatible* with one another, however, and some standard-maker was necessary to bring order out of chaos. As you might expect, the first standard-setter was Ma Bell herself.

Back when it had a monopoly on telephone communication in the United States, AT&T created two modems, the Model 103 and the Model 212, which soon became de facto modem standards for 300-bps and 1200-bps telecommunications, respectively. In 1964, in an effort to create consistent modem standards around the world, both domestic and international modem manufacturers shifted the focus of standards making to an international organization called the CCITT (a French acronym that translates as International Telegraph and Telephone Consultative Committee). The standards set by the CCITT ensure that a modem can send to, and receive from, modems around the world.

When shopping for a modem, you come face to face with standards and *protocols*, and it's easy to get confused. A communications protocol, such as the Microcom Networking Protocol (MNP), is a blueprint that details exactly how a particular telecommunications task will be accomplished. MNP, for example, is a set of rules developed by Microcom to

combat line noise and ensure correct data transmission between modems.

A standard, on the other hand, is a widely accepted protocol or set of protocols. About ten years ago, Microcom's MNP was simply one of many error-correction protocols. As time passed and MNP evolved, Microcom implemented better schemes for error control. These schemes, known as MNP Classes 2 through 4, were adopted by other modem manufacturers and thus became a de facto industry standard. In 1988, MNP Classes 2 through 4 were made part of the CCITT's V.42 error-correction standard.

TIP 2 The most important point to remember about CCITT standards is that

make 9600-bps modems that support their individual protocols—so as not to leave their past customers out in the cold—and that are V.32-compliant, meaning that their modems will adhere to, and work with modems that support, the CCITT V.32 standard.

TIP 3 If you're in the market for a 9600-bps modem, make sure it's at least V.32-compliant. While virtually all new 9600-bps modems are V.32-compliant, there are many older modems now being sold on the used market that are only "V.32-compatible," which means that they may or may not connect correctly with a true V.32 modem. Don't be fooled by these "compatible" units; buying a V.32-compliant modem will save you time and headaches.

TIP 4 If you buy a V.32 or V.32bis modem (the latter is an extension of the V.32 standard and allows modems to transmit at a blazing 12,000 bps and 14,400 bps), do not worry about connecting with slower modems. When modems connect, they go through a negotiation process, and they always try to connect at the fastest speed that both modems support.

So a faster modem will automatically fall back to a slower speed when necessary.

Avoiding Errors

STATIC AND NOISE ON A PHONE LINE are mere annoyances when you're talking to a friend, but they're major problems to a stream of data. Noisy lines can garble data, preventing information from transmitting correctly.

It is possible to control errors on telephone lines with error-correction schemes based in either software or hardware. One method is the aforementioned MNP Classes 2 through 4, which are part of the CCITT's V.42 error-correction standard. Another error-control protocol, LAP-M (Link Access Procedure-Modem) is also included in the CCITT V.42 standard.

TIP 5 Buying a model that is V.42-compliant is a good idea because it means that the modem will establish an error-free connection to other V.42 modems as well as to any modem that is MNP-compatible.

Turning More into Less

DATA COMPRESSION IS THE SAME IN telecommunications as it is in other areas of computing—it packs more data into a given space. By increasing the density of the data through compression, you increase the *throughput* of the modem link. For example, transmitting an uncompressed 100K file over a 2400-bps modem takes about 8 minutes. With a compression utility such as Aladdin's StuffIt or Salient's DiskDoubler, you can shrink the size of the file down to 50K. As a result, that same file takes only about 4 minutes to transmit at 2400 bps, yet it has all of the data of the original file. In effect, by compressing the file by 50 percent you get the performance of a 4800-bps modem—even though the modem actually transmits the data at 2400 bps.

Data compression can also be achieved through modem hardware; as it sends, the transmitting modem compresses the data and the receiving modem decompresses the data automatically. The process is completely invisible to the user; you just get faster transmissions than you would otherwise. Hardware compression is typically faster than software compression, and compression that is built into the modem hardware is automatically available whenever you send or receive a file. Also, you don't need to worry if the modem you're sending to has the same hardware compression scheme as yours—your modem will attempt to make a connection using compression but will fall back to a standard connection if the attempt fails.

Most modems today offer built-in hardware data compression. Microcom's MNP 5 data-compression protocol is good for an average throughput efficiency of about 200 percent, meaning that a 2400-bps modem can achieve 4800-bps throughput. The CCITT's V.42bis protocol does even better, with a 400 percent improvement, giving 2400-bps modems that support V.42bis an effective throughput of 9600 bps. MNP 5 modems have been widely available now for several years, V.42bis units for less time, but this standard is fast becoming, well, *the* standard.

TIP 6 Although many new modems support both V.42bis and MNP 5 data compression today, not all do. For maximum flexibility in hooking up with other modems, it's best to get a modem that supports both compression standards.

TIP 7 The fastest raw modem speed commonly available today is from a V.32bis modem, which runs at a modulation speed of 14,400 bps. Modem manufacturers who claim faster speeds than that



LUIS DELGADO

PSI's 14,400-bps Comstation Five fax modem (left); Telebit's portable 9600-bps QBlazer (middle); and Xeba's 2400-bps QuickTel (right).

the numbers in a standard's name are pretty much irrelevant. In other words, the V.42 (pronounced "vee-dot-forty-two") standard doesn't mean you obtain "better" or faster telecommunications than with the V.32 standard. In fact, V.32 is the standard for 9600-bps communications, while V.42 is an *error-correction* standard.

Getting Up to Speed

THERE ARE THREE TYPES OF MODEM standards that you should become familiar with: *modulation*, or speed; error correction; and data compression. In terms of speed, the two CCITT standards you're most likely to encounter are V.22bis and V.32. The first of these, V.22bis, defines 2400-bps communications and is supported by virtually all modems sold in the United States today.

V.32 is now the standard for 9600-bps communications, but in the past the major modem manufacturers, such as Hayes, U.S. Robotics, and Telebit, have all had their own proprietary protocols for 9600-bps transmission. Today, these vendors

are basing those speeds on the effective throughput rates that can be accomplished only with data compression. So a 9600-bps, V.32 modem that also has V.42bis data compression can theoretically achieve throughput speeds of 38,400 bps; and a V.32bis/V.42bis modem can hit throughput speeds of an incredible 57,600 bps.

In the real world, though, these modems don't often reach those maximum speeds; noisy phone lines, inefficiencies in communications software, and other factors mean that your real data mileage is almost always less, but it's still better than if you weren't using compression at all.

In addition, data compression doesn't work on all files equally. You're likely to achieve the maximum possible throughput only on text and on some graphics files, which respond best to data compression. Font and sound files, which already have compact data structures, don't benefit much, if at all, from the compression built into a modem. Neither do files that are already compressed through software such as StuffIt. The V.42bis protocol recognizes this and reduces or turns off compression if it's not advantageous.

Modem Sharing

IN THE BEST OF ALL WORLDS, THE rule would be One User, One Modem. But for most companies, it's impractical to have a modem and dedicated phone line at every desk. An elegant solution is to share one modem among many users via a LocalTalk or Ethernet network. This is accomplished by either a direct hardware connection to the network, as pioneered by Shiva with its line of NetModems, or via software.

With the hardware connection, the modem is just another network device; it accepts a LocalTalk or Ethernet plug and shows up in the Chooser just like a file server or a shared printer. With a software connection, one Mac is linked to the modem via a serial cable going into the modem port; that Mac, known as the modem server, also runs software in the background that allows other users on the network to access the modem.

Each approach has its pluses and minuses. Modems that hook up to the network directly are always available to the users; if the modem server Mac is turned off or crashes, the other users on the network lose their shared modem. Also, a hardware-shared modem is fully dedicated to the task; performance can suffer on a modem server because the software runs in the background on that machine. If the Mac running the modem server is busy with an intensive foreground task, like recalculating a large spreadsheet, the background task of modem serving can slow

down. In an extreme case, in which the foreground task involves a lot of disk access and computation, the modem server can be interrupted, causing you to lose the connection.

On the other hand, a hardware-shared modem has to include network electronics in addition to the modem circuitry, which raises the price. For example, the Shiva NetModem V.32 is a 9600-bps shared modem that costs \$1189. It doesn't have V.42bis or V.42 protocols, so the best possible throughput is just 9600 bps. In

contrast, the Hayes V-series Ultra Smart-modem 9600 is a V.32 unit that lists for \$999 and includes V.42, V.42bis, and MNP 5, so the throughput can go as high as 38,400 bps.

TIP 8 Large companies or departments will probably be more comfortable with hardware-networked modems, as one or more of them can be kept in the phone closet with the network hubs and other hardware. But if you need to share a modem with just a few other users, you'll

Modem Talk

AT COMMAND SET The standard commands used to send instructions to a modem. The letters AT stand for ATtention and are usually followed by one or more commands to the modem. Developed for modem use by Hayes Microcomputer Products. Modems that use the AT command set and a Hayes-patented modem-escape sequence are said to be Hayes compatible.

BAUD RATE A measure of data-transmission speed. Baud equals the number of times per second the modem modulates the computer's signal. At low speeds such as 300 bps, 1 baud is roughly 1 bps. Baud rates are often used interchangeably with bps but are not exactly the same.

BIS A term taken from French, meaning "second." A CCITT standard number with bis appended to it, such as V.42bis, denotes the second version of that standard.

BPS Bits per second. A measure of communications speed. The number of data bits transmitted per second. See also *baud rate*.

COMPATIBLE In the general sense, the ability of different protocols or devices to work together. Differs from compliant in that *compatible* has been used by some manufacturers to denote devices that can coexist with, but not actually use, the CCITT V.32 9600-bps standard.

COMPLIANT Uses, adheres to, and works with a specified CCITT standard.

CPS Characters per second. A measure of communications speed; 1 cps is roughly 8 bps.

ERROR CORRECTION A technique for eliminating data-transmission errors, usually by embedding extra bits of data in the data stream. If the correction bits are garbled, the data is resent. Typical error-correction protocols are MNP Classes 2 through 4, and LAP-M. V.42 is the CCITT standard that includes these protocols.

FILE-TRANSFER PROTOCOL A software scheme for eliminating transmission errors when sending files. These schemes send data in small chunks called packets, then check each packet for errors. If the software detects an error, the protocol resends the packet. If no errors are detected, the next packet is sent. Common file-transfer protocols include Xmodem, Ymodem, Zmodem, and Kermit.

FULL DUPLEX A mode of transmission in which data is sent in both directions simultaneously. Full duplex is the usual mode for the majority of data transmissions.

HALF DUPLEX A mode of transmission in which data is sent in only one direction at a time. Most commonly used in fax transmission.

HANDSHAKE The sequence of signals that two modems exchange in order to establish the common speed and format used by the modem for data transmission.

HAYES COMPATIBLE See *AT command set*.

MODULATION SPEED The raw speed of a data transmission; does not take into account error correction or data compression. Expressed in bps.

PROTOCOL A set of rules defining common data structures for sending and receiving information. Protocols define such things as error-checking conventions and how data is formatted.

STANDARD A method that the telecommunications industry has agreed on for two modems to communicate. Standards may include one or more protocols and are set by the international body called the CCITT (International Telegraph and Telephone Consultative Committee).

TER A term taken from French, meaning "third." A CCITT standard number with *ter* appended to it denotes the third version of that standard.

THROUGHPUT The effective speed of a communications channel. Can be higher or lower than the modulation speed, depending on line conditions and whether error correction and/or data compression is in use.

MANUFACTURERS AND MODEMS

Company	DATA SPEED IN BPS (MFR. CLAIM)								Networkable	Fax Capability
	2400	4800	9600	12,000	14,400	19,200	38,400	57,600		
Abaton/EMac	•	•					•		software	•
Applied Engineering	•		•							•
Circuit Research	•						•	•	software	•
Computer Peripherals	•	•	•	•	•	•	•	•		•
CXR Telecom/Anderson Jacobson	•		•		•	•				
Cypress Research Corporation	•								software	•
Dove Computer Corporation *	•				•				software	•
E-Tech Research			•				•			•
Farallon Computing			•							
FastComm Communications	•	•				•	•			
Global Village Communication	•		•		•					•
Hayes Microcomputer Products			•				•		software	
Logicode Technology	•		•		•		•	•		•
MacProducts USA	•		•		•		•		software	•
Mass Microsystems	•									•
Microcom			•				•		software	
Motorola Codex							•			
Multi-Tech Systems	•		•		•	•	•	•		•
NEC America			•			•	•			
Outbound Systems	•									•
Practical Peripherals			•					•		•
Prometheus Products	•		•				•	•		•
PSI Integration	•		•					•	software	•
Racal-Datcom	•	•	•	•	•				software	
Shiva Corporation	•		•					•	Ethernet, LocalTalk	
Supra Corporation			•				•	•		•
Telebit Corporation			•			•	•	•		
Telenetics Corporation	•		•			•	•	•		•
U.S. Robotics	•		•		•	•	•	•	software	•
Zoom Telephonics	•		•		•		•	•		•

* At press time, Dove was reorganizing under Chapter 11. Solid bullets in the Data Speed columns indicate that the manufacturer sells a modem or modems operating at the indicated speed. The highest raw modulation speed any modem currently on the market can perform is 14,400 bps; throughput rates above that are achieved through data compression and are based on manufacturers' claims.

get more for your money by buying a modem that networks via software.

Should You Get the Fax?

WHILE SHOPPING FOR A DATA MODEM, you face another decision: do you want to send and/or receive faxes from your computer? If so, you want a fax modem. Fax modems used to be more trouble than they were worth, but with recent software and hardware improvements, faxing is almost as easy as printing.

When shopping for a fax modem, you'll probably encounter quite a few 24/96 models, and it's important to understand what those two rates mean in context. Data transmission and faxing require different communications protocols; the standard Group III fax machine sends fax information at 9600 bps, but data transmission at 9600 bps requires a more complex scheme. As a result, many fax modem manufacturers—in an effort to produce an inexpensive, efficient product—offer data transmission at 2400 bps (rather than the more-costly-to-implement

9600 bps). Thus, 2400 bps refers to the data speed, and 9600 bps is the fax speed; you can't transmit data at 9600 bps with a standard 24/96 fax modem.

Prices for fax modems have significantly dropped in recent years. The 24/96 fax modems are the most affordable fax modems, available at street prices under \$200 from MacProducts USA, Zoom Telephonics, Global Village Communication, Supra, and several others. For \$200 to \$300, you can get modems with fax-receive capability from the same companies. But if you're looking for a fax modem that sends data at 9600 bps or faster, you have to spend a bit more—for example, Supra's SupraFaxModem V.32bis can handle 14,400-bps data transmission without data compression, has the new 14,400-bps fax speed, and still only costs \$399. In the near future, you'll see more stand-alone fax machines use this 14,400-bps speed, as the fax chips that work at this speed are beginning to ship in volume.

Some fax modems, such as the Prometheus Ultima, now offer voice-messag-

ing features. This turns the Mac into an answering machine; callers can leave voice messages, which are digitized and stored on a hard drive. You can have special outgoing messages for particular callers, and the system can even forward messages to another phone number. While it sounds great in theory, voice messaging has some problems in practice. In order not to miss any messages, you need to leave the Mac on all the time; the messages take up a lot of space on a hard drive; and if the Mac crashes while you're out, you're going to miss your phone messages. Make sure you get a thorough test drive before you invest in a modem with voice messaging.

TIP 9 Even if you already own or have access to a fax machine, a fax modem can be a good investment. Faxing from your desktop modem means you don't have to take those extra steps of printing your document and then feeding it into a fax machine. It also saves you from having to put your document into the office fax queue. In addition, most fax modem

software enables you to send the same document to many recipients easily.

The extra cost of the fax chip and software adds \$100 or less to the price of a data-only modem, so why not have the fax capability? Even if you use the fax features only occasionally, it's worth the extra money to have those conveniences.

Selecting the Right Software

THE MODEM IS ONLY HALF OF THE communications equation. The other half is the software that works with the modem, and lots of packages are available. Many modem manufacturers bundle communications software with the hardware. Since it's free, you usually get what you pay for—bundled software tends to be of the bare-bones variety, with few of the amenities that enable you to work quickly and easily online. Among the important amenities you'll want are scripting, which allows you to automate all or part of an online session, and advanced *file-transfer protocols* like Zmodem.

ZTerm, a full-featured communications program by David Alverson, is available from online services and most user groups as shareware. Try out the program for a few weeks; if you like it, pay the author \$30. It provides scripting and includes Zmodem, yet costs much less than most commercial packages.

Among the commercial programs, the three most popular are Hayes's Smartcom II (\$149), FreeSoft's White Knight II (\$139), and Software Ventures' MicroPhone II (\$295).

Smartcom II is the easiest of the three to use; it has a clean interface and a simple-to-understand script-making facility. Although its script language is not as powerful as those of the other two programs, Smartcom II is much more accessible to the average user and provides the tools to handle most of the online sessions you might want to run.

MicroPhone II and White Knight are well suited to people with more complex communications needs. While these two programs provide plenty of features and prewritten communications settings for the casual user, advanced users are in their element. Both programs have script languages rich in features that you can use to implement complex functions, such as a miniature bulletin board system and automated data retrieval from online services.

Some online services, such as America Online and Prodigy, provide the terminal software needed to access their services. Both America Online and Prodigy bring a point-and-click Mac interface to the task of navigating their respective services, although America Online has a much clearer and more intuitive interface.

A Closer Look at Modem Features

1 Prices for modems offering a 9600 bits-per-second data-transmission rate have come down recently, making them a good value. And while some online services currently support only 2400-bps transmission, many of them will move to 9600 bps in the near future.

2 CCITT V.32 is the standard for 9600-bps telecommunications; V.32 ensures that the modem will work with the vast majority of 9600 modems supporting the same transmission standard. Look for V.32 if you buy a 9600-bps modem.

3 The CCITT V.42 error-correction standard ensures that a modem can establish a clean connection to other V.42 modems. This standard also incorporates another error-control protocol, LAP-M (Link Access Procedure-Modem).

4 Modems with data-compression protocols, such as MNP 5 and V.42bis, can send data at much faster speeds than modems without data compression. MNP 5, for example, enables a 2400-bps modem to send at about 4800 bps. Modems with V.42bis can move data even faster. Currently, MNP 5 is more commonly found in modems; a modem with both protocols would be ideal.

5 On a 2400/9600 modem, the 2400 refers to the data-transmission speed, 9600 to the fax transmission speed. While these speeds are currently the most common, your best bet is to buy a modem that can send faxes at 9600 bps or 14,400 bps and receive at 9600 bps.

6 Make sure that any modem you buy is Hayes compatible, meaning that it will accept the universal AT command language that Hayes Microcomputer Products developed for its modems.



While you can access CompuServe with a general communications program, CompuServe also sells two front-end programs that make getting around this complex service much easier. CompuServe Navigator (\$99.95) is designed for logging on to CompuServe, getting lists of the available messages and files, and logging off. While off line, without the clock running, you choose which messages and files you want to receive. Then you let Navigator log back on, retrieve the chosen material, and log off. You can then review the downloaded data at your leisure. Another program, CompuServe Information Manager, is oriented more toward the user who wants to browse the service with the help of a Mac-like interface.

TIP 10 For the beginner who wants a solid, easy-to-use general communications program, Smartcom II is recommended. For more advanced communications needs, it's a toss-up between MicroPhone II and White Knight.

What's Ahead?

MODEM TECHNOLOGY HAS BEEN changing rapidly over the past few years, and it's reasonable to wonder if the modem you buy today will soon be obsolete.

Based on what the CCITT is considering, it appears that the market has at least a year of breathing space before the next big wave of innovation hits. CCITT is working on a new modem standard, currently dubbed V.fast, which will enable

modems to reach a raw speed of 19,200 bps to 24,000 bps over standard telephone lines. If all goes well, this standard could be finalized sometime in 1993, with products incorporating the standard appearing shortly thereafter.

In 1994 and later, ISDN (Integrated Services Digital Network) is expected to become available to a majority of U.S. telephone customers. ISDN is an international telecommunications standard that enables a single line to simultaneously transmit voice, video, and data signals (see "Digital Data on Demand," *Macworld*, February 1992). Because ISDN provides a digital connection, as opposed to the analog telephone lines we currently use, it promises to make modems obsolete. You will replace your modem with an ISDN connection, which will provide you with completely clean, 64,000-bps communications.

But not to worry: even when ISDN becomes widely available, analog phone lines (and therefore modems) aren't going to disappear—just as black-and-white TVs are still produced, despite the omnipresence of color stereo sets. And in such a fast-moving field as telecommunications and electronics, that's about the best we computer users can ask for. **m**

See *Where to Buy* for contact information.

TOM NEGRINO is a *Macworld* contributing editor. His wife wishes he would order a dedicated modem line.

SLIDES

WHILE YOU

Four years before there were film recorders for the Macintosh, C. H. Banks, a partner in the Dallas service bureau Associated Graphics, was creating presentation slides from his Mac. "We would produce images in MacPaint and MacWrite and print them out at the best quality we could on white paper," Banks explains. "Then we'd stick those pieces of paper on the wall and shoot them with a Polaroid black-and-white slide-film camera. The slides looked terrible, but at the time, this was state-of-the-art slide-making on the Mac."

The state of that particular art has changed considerably. Today, there are roughly a dozen film recorders available for the Mac; and while all of them promise to affordably, quickly, and easily generate slides directly from the Mac, they don't always live up to their marketing claims. Affordability, for example, is in the eye of the beholder; the lowest-priced film recorder costs \$5000, while some higher-end models cost over \$30,000 (see "Justifying a Film Recorder").

So what exactly is a film recorder, and why would anyone buy one? A film recorder is essentially a 35mm camera, a monochrome CRT (cathode-ray tube), and a color-filter wheel all wrapped up inside a nondescript box—an electronic darkroom on your desktop (see "Inside a Film Recorder"). Almost every film recorder is a QuickDraw-based SCSI device; only General Parametrics Corporation's Spectra Star 450 slide maker—thermal color printer combination uses a PostScript RIP. (Other film recorders, such as Presentation Technolo-

WAIT

by James A. Martin

gies' Montage FR2 and Agfa's models, can be equipped with optional PostScript RIPs; all film recorders support PostScript-compatible software interpreters such as Custom Applications' Freedom of Press Professional or Visual Business Systems' Professional Output Manager.)

There are plenty of reasons to take the plunge into slide making. Generating a slide presentation in-house and having it ready to show the next day can provide an important business advantage. Service bureaus use high-end film recorders to offer slide services to customers. And the medical community is fast becoming one of the film recorder's best customers; videotapes of surgical procedures can be edited into slide shows.

Macworld Lab tested eight film recorders to determine which ones offer the best value and performance.

Macworld Lab tests eight film recorders that create slides from on-screen images



Pictured clockwise are Agfa's PCR II, General Parametrics' Spectra Star 450, and Mirus Industries' FilmPrinter Turbo II.

Missing from the lineup are Agfa's Forte, and Verité from Prime Option (formerly American Liquid Light), which didn't arrive in time for our testing. Also absent is Presentation Technologies' replacement to its Montage FR1 film recorder; a shipping unit of the new FR2 wasn't available by our deadline. We took into consideration how easy (or how difficult) the product is to use, hardware flexibility, hardware and software controls and features, the amount of time required to image slides, and finally, the quality of the slides (which we judged by both projecting the slides on a screen and looking at them through a 4X loupe on a light box).

Hardware Controls and Flexibility

IDEALLY, A FILM RECORDER SHOULD offer certain hardware controls to make using it easier—the ability to push a button and rewind the film, for example, or a liquid crystal display (LCD) panel that lets you know what the film recorder is

doing. Unfortunately, this is not always the case.

Most film recorders offer at least some level of hardware control and user feedback. For example, all three Lasergraphics models—the LFR Mark II, the LFR, and the Personal LFR—use the Ricoh/Lasergraphics SmartBack 35mm camera, which I found to be the easiest of the cameras to use. The SmartBack includes a 16-character LCD that tells you, among other things, how many exposures have been made and how many are left on the roll of film.

The General Parametrics film recorder—thermal color PostScript printer combination, the Spectra Star 450, includes a 2-line LCD panel and push-button controls, which help to offset the product's murky documentation. And the push buttons on Mirus's FilmPrinter Turbo II make it easy for you to rewind film and to switch between connections for hooking up either a Mac or a PC.

Agfa's recently released PCR II film recorder takes top honors, though, for its hardware controls and feedback. The PCR II's 2-line, 16-character LCD keeps you well informed as to what's going on inside the film recorder. The display gives you what Agfa calls "intelligent error messages" (how many "intelligent" errors have you made lately?) and tells you the name of the file you've just selected for printing, how many images have been exposed on the film, the output resolution chosen (2K or 4K), and more. Using the PCR II's settings panel, you can change the recorder's pacing (a function that matches the timing of the film recorder to the rasterization speed, thus eliminating some imaging problems), color control, and other settings. (Agfa's ProColor Premier features a settings panel and an 8-character, 1-line LCD and offers many of the same hardware adjustments, such as pacing, as the PCR II does.)

Some film recorders, particularly lower-end models such as the Personal LFR and the FilmPrinter Turbo II, come with a 35mm camera permanently mounted; you can't use another type of camera. That's fine if you plan to do nothing but generate 35mm slides. Other recorders enable you to use various types of devices such as bulk loaders, Polaroid instant print cameras, or 70mm cameras.

Software: No Clear Winner

AMONG THE FEATURES ALL FILM-RECORDER programs have in common are support for PICT files; color-balance controls; the ability to batch-print files; and slide preview. Although many recorder applications allow you to print TIFF files, several applications, such as those of the GCC, Polaroid, and the Lasergraphics models, do not; you have to convert the TIFF file into PICT format and print the file from an application such as Adobe Photoshop (printing from an application can slow down the print speed).

Although many of the programs that come with the film recorders work fine, there is no shining star. For instance, GCC's Print Manager and Mirus's Mirus-Print were our favorite programs—from film recorders aimed at beginning and low-end users—in spite of some problems. GCC's Print Manager's visual cues and language are quite clear. For example, Print Manager's dialog boxes lead you clearly through the process for adjusting letterspacing in a slide's text, and changes appear as you make them.

Print Manager also offers image-enhancement options for eliminating *blooming* (an aberrant color that sometimes develops between two colors), and for antialiasing (for more on imaging

Inside a Film Recorder

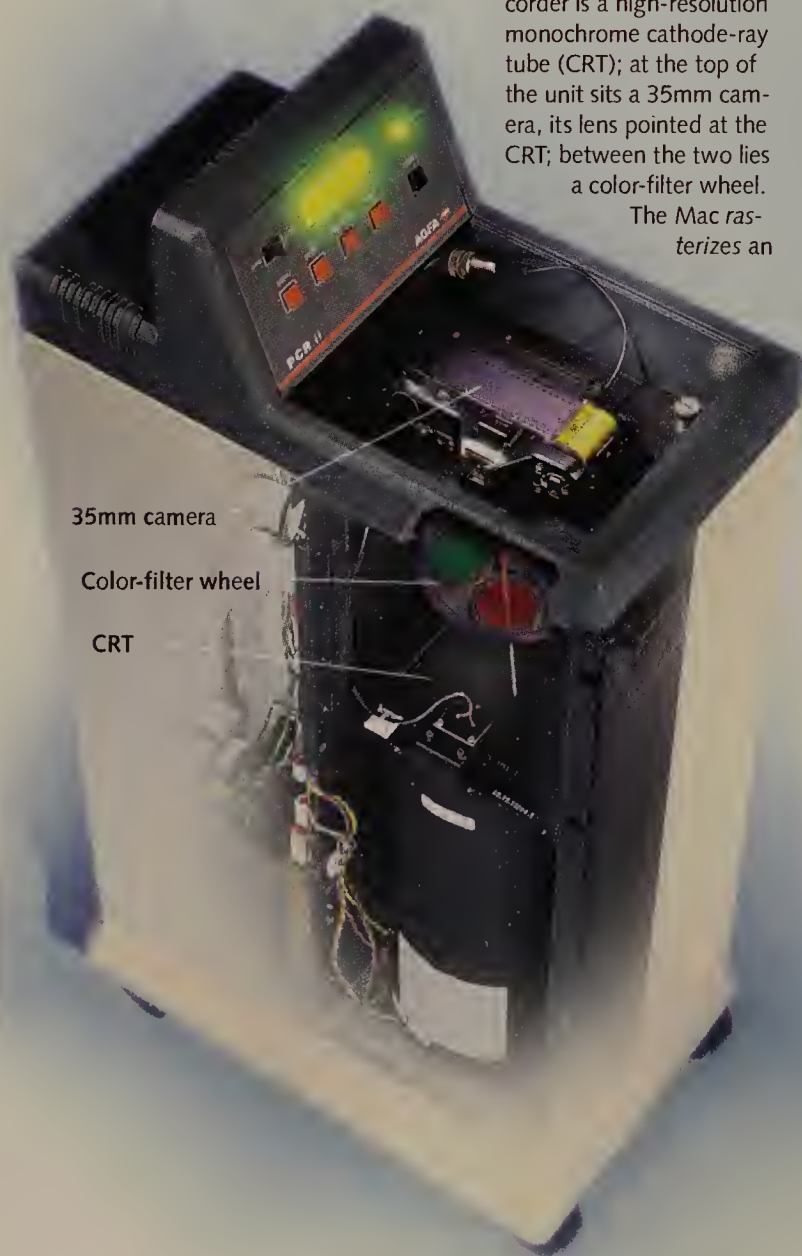
At the center of a film recorder is a high-resolution monochrome cathode-ray tube (CRT); at the top of the unit sits a 35mm camera, its lens pointed at the CRT; between the two lies a color-filter wheel.

The Mac rasterizes an

image (converts it into a matrix of dots); separates it into red, green, and blue digital information; and sends that data to the film recorder. The film recorder opens the camera's shutter. Then for each separation, the recorder quickly sweeps an electron beam line-by-line across the entire face of the CRT, creating a small spot of light (similar to a laser beam) for each dot of the rasterized image.

The spots projected from the CRT pass through one of the color filters and enter the camera lens. The wheel alternately positions the red, green, and blue filters across the path of the light. The red filter stays in place while the camera captures all of the red information for the image. The color wheel then moves the green and finally the blue filter in place, repeating the capture process for each separation. This is how the film recorder generates the millions of colors that ultimately appear in your slides.

The camera's shutter closes after the color wheel completes its three-pass cycle. The camera captures the image in full color and in high resolution on the film. The film advances to the next frame and the process begins again.



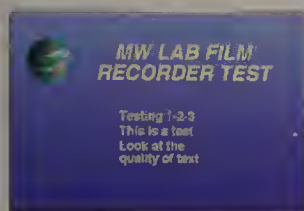
35mm camera

Color-filter wheel

CRT

Slide Maker Speeds

Text with Logo



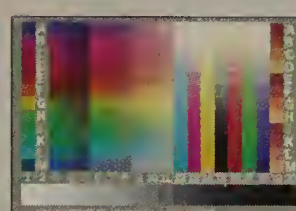
Pie Chart



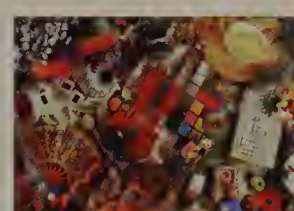
Rafters



Batch Printing



Baby and Violin



4K Resolution

	Text with Logo	Pie Chart	Rafters	Batch Printing	Baby and Violin
ColorFast	340	422	376	3094	1507
FilmPrinter Turbo II	120	141	102	1195	341
LFR	290	536	288	2611	603
LFR Mark II	100	332	102	1071	286
LFR Mark II*	56	139	65	494	241
PCR II	178	414	167	1207	1356
Personal LFR	138	369	144	1328	303
ProColor Premier	174	404	168	1374	1347
Spectra Star 450	642	2626	972	6173	9972

2K Resolution

	Text with Logo	Pie Chart	Rafters	Batch Printing	Baby and Violin
ColorFast	167	196	180	1565	1505
FilmPrinter Turbo II	90	179	83	991	288
LFR	79	217	87	812	231
LFR Mark II	41	164	49	454	189
LFR Mark II*	41	90	49	333	204
PCR II	94	215	91	772	615
Personal LFR	95	207	105	986	208
ProColor Premier	99	210	94	946	604
Spectra Star 450	184	422	237	1847	3392

Times are in seconds. *Using RISC Rascol external rasterizer.

The slides generated for the speed tests represent a variety of rasterizing challenges to a film recorder, from simple (the text with the logo image and the pie chart) to moderately difficult (the rafters) to complicated (the 10MB Adobe Photoshop-scanned image of the baby and violin). The tests were performed on a Macintosh IIci with System 7.0.1, 8MB of RAM, an 80MB internal hard drive, and Apple's cache card. Test images were rasterized on the IIci—except for the Spectra Star, which uses a PostScript printer for the task, and for the LFR Mark II equipped with a RISC

Rascol. Because rasterization takes place on the Macintosh with most film recorders, overall performance depends on the type of Mac you own. Images were printed from within the film recorder's software and not from another application, such as Aldus Persuasion. We printed all slides at both high resolution (4K) and medium resolution (2K). The batch-printing test consisted of 11 different slides ranging in complexity. Speeds include times for rasterizing and printing.

problems, see *Lab Notes*, in this issue). But frankly, with the test files we printed, neither feature made much difference.

MirusPrint is simple to navigate, offers a handful of thoughtful features (such as the ability to automatically shut down the Mac after finishing a batch-print job), and provides helpful visual clues about what the film recorder is up to. MirusPrint lets you create and save your own color lookup tables, which can help you get better color out of your film. But because the color lookup tables affect the film, and not your monitor, you can't view the changes on screen; thus, adjusting the tables involves a good deal of trial and error and a good deal of patience.

I ran into a snag with MirusPrint's previewing feature, however. I couldn't preview a spooled, 32-bit, 13MB color Photoshop TIFF image, which had been saved as an RGB file; MirusPrint only displayed a black box. When I asked the folks

at Mirus about this, they suggested I save the image as an 8-bit indexed color file and then preview it (the idea being that the large 32-bit image could be hitting a memory ceiling). That didn't work, either, and Mirus's response was that it "doesn't really target Photoshop users" with its product. Fair enough, but it's a limitation nonetheless.

Among low-range to midrange film recorders, the Lasergraphics machines offer software with several useful features but with limitations, too. (Under a licensing agreement, the software for Presentation Technologies' Montage FR2 is essentially the same as the Lasergraphics software.) Lasergraphics film recorders force you through a two-step process when imaging slides. To print (or preview) a slide, you must first create a queue in the MacRascol Q desk accessory; then, in the MacRascol RIP software, you select the queue you want to print.

You can't directly print a TIFF file in MacRascol RIP; you have to convert the TIFF file to PICT, or print from an application such as Photoshop 2.0 that handles TIFF files. Also, the software commands aren't always straightforward; in order to preview an image, for example, you have to choose Cropping as an option in MacRascol RIP. On the plus side, you can print slides in the background; although background printing releases the Mac for other tasks, it can mean that slides take twice as long to image.

Agfa's Conductor is the most feature-packed software package. With the ability to preview, resize, crop, stretch, center, rotate, and zoom in on an image, as well as to adjust color, Conductor could almost be mistaken for a low-end image-editing program. In addition, Conductor gives you the best feedback of any film-recorder software; it tells you exactly what's going on ("Recording Red Pass,"

FILM RECORDERS COMPARED

Product	Forte	PCR II	ProColor Premier	ColorFast	Spectra Star 450	LFR
Company	Agfa	Agfa	Agfa	GCC Technologies	General Parametrics	Lasergraphics
Suggested retail price	\$36,000	\$13,500	\$7500	\$5999	\$14,990	\$8750
CRT diagonal screen size (in inches)	7	7	7	3.25	3	6
CRT dot size (in millimeters)	0.037	0.037	0.1	0.05	0.003	0.043
Image resolutions	2K, 4K, 8K	2K, 4K	2K, 4K	1K, 2K, 4K	2K, 4K	2K, 4K
Resolvable color resolution	36-bit	30-bit	24-bit	33-bit	24-bit	33-bit
Maximum colors per slide	68.7 billion	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million
Chooser driver	○	○	○	●	●	●
Number of hardware resident fonts	35	35	35	22	35	8 ¹
Supports image scaling	●	●	●	●	●	●
Supports image cropping	●	●	●	○	●	●
Uses Mac to rasterize images	●	●	●	●	○	● ²
Name of camera manufacturer	Nikon	Nikon	Chinon	Mamiya	Pentax	Ricoh/Lasergraphics
Optional bulk film loader	●	●	●	●	○	●
Supports 4 x 5 camera	●	●	○	●	●	●

● = yes; ○ = no. ¹ Lasergraphics fonts are software, not hardware, resident. ² With optional RISC Rascol, film recorder rasterizes images. ³ With SlideScript RIP, film recorder rasterizes images.

“Recording Green Pass,” and so on), and a ruler with a moving tick mark shows you how far that task has progressed. Once the job is done, Conductor informs you how much time it took to image the file, what kind of file it was, the resolution of the file, and more.

But with all of its features and controls, Conductor takes more time to learn than the other film recorder programs do. Also, at times it feels awkward to use. Using Conductor’s zoom tool within preview mode, for example, feels a bit like walking in outer space; the tool forces

you to draw a box—by slowly dragging toward the lower-right corner—around the part of the image you want to magnify. And if you make several alterations on an image, you can’t easily restore the file to its original preview size, as Conductor offers only one level of undo.

Justifying a Film Recorder

With prices from \$5000 to \$36,000, film recorders aren’t exactly an impulse purchase. But the cost of having slides processed out-of-house can add up significantly over time, too. Service bureaus charge anywhere from \$4 to \$20 to create a typical slide with a 48-hour turnaround; for rush jobs (24 hours or less) be prepared to pay up to \$60 per slide.

To decide if a film recorder is worth its expense, start by determining how many slides per year you generate. Figure that the average business presentation contains anywhere from 8 to 25 slides and that, ideally, there should be 1 or 2 slides for every minute of a typical presentation.

If you must make a 20-minute slide presentation each month, for example, then figure at a minimum you need to generate about 240 slides per year (that’s 20 slides each month, based on the 1-per-minute theory). Providing that you never need a rush job, and given that the average service bureau charges about \$8 per slide, you’d pay \$1920 per year for slides output from a service bureau. Within two years, that’s \$3840; at this rate, it would take just over three years to recoup the cost of a low-end film recorder, such as the Lasergraphics Personal LFR (\$5995).

Aside from the initial purchase price, there are other costs to consider. Among them are film and processing (generally, about 80 cents per slide); training; cost of resources (most film recorders are slow and can tie up a Macintosh for 25 minutes or more); service (most manufacturers charge \$180 to \$1500 per year for extended warranties); support (the salary of someone on staff to maintain the film recorder, or a support contract with the dealer you bought it from); and equipment upgrades.

There’s one cost-justification factor, however, that’s difficult to foresee: how much you actually use the film recorder once you’ve bought it versus how much you planned to use it before you purchased it. John Sloan, chairman of the surgery department at the Chicago College of Osteopathic Medicine, is a case in point. “I justified the purchase of a film recorder based on the fact that I was sending 500 slides per year to the service bureau at \$15 per slide,” he says. “What I didn’t expect, though, is that since I bought a film recorder, I’m making 1500 to 2000 slides a year.”

The Waiting Game

ONE THING YOU’LL NEED IF YOU BUY a film recorder, aside from a wad of money, is patience. With most recorders, the computer is tied up from the moment you select a slide to be printed to the final click of the camera—a process that, in our experiments, took anywhere from 50 seconds for a simple MacDraw Pro PICT file to 25 minutes for a 10MB Photoshop file printed at 4K resolution (see “Slide Maker Speeds”).

The slowest film recorder was far and away the General Parametrics Spectra Star 450. In every speed test, the Spectra Star came in dead last. The Spectra Star’s slow speed is a result of its curious design. Unlike the other film recorders, the Spectra Star depends on the PostScript RIP inside the Spectra Star color printer to rasterize slides. The Spectra Star printer was designed for 300-dots-per-inch color output; imaging color slides, however, requires the printer to process up to 15 times the amount of color data needed for a color printout. That’s because slides, particularly those imaged at 4K (4096 pixels across by 2732 pixels down), are much higher in resolution than a typical 300-dpi color printout. True, the Spectra Star’s ability to store slides on the printer’s built-in 32MB hard drive and to print slides in the background somewhat mitigates the

LFR Mark II	Personal LFR	FilmPrinter			
		Turbo II	Digital Palette	Montage FR2	Verité
Lasergraphics	Lasergraphics	Mirus Industries	Polaroid	Presentation Technologies	Prime Option
\$14,995	\$5995	\$7995	\$5995	\$6995	\$4995
6	4	2.4	3.25	3	3
0.027	0.031	0.05	0.05	0.03	1
2K, 4K	2K, 4K	1K, 2K, 4K	1K, 2K, 4K	2K, 4K	2K, 4K
33-bit	33-bit	36-bit	33-bit	36-bit	33-bit
16.7 million	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million
●	●	●	●	●	○
8 ¹	8 ¹	35	22	35	0
●	●	○	●	●	●
●	●	○	○	●	●
● ²	● ²	●	●	● ³	●
Lasergraphics	Lasergraphics	Ricoh	Mamiya	Ricoh	Pentax
●	○	○	●	●	●
●	○	○	●	●	●

recorder's foot-dragging; still, anyone who routinely faces rush jobs will want to steer clear of this film recorder.

Competing with the Spectra Star for the Mañana medal is GCC's ColorFast. The absence of background printing on the ColorFast makes its sluggish printing even more frustrating than the Spectra Star's. The best option with the ColorFast is to batch-print files overnight, but if you need to drop off your film at the end of the day for overnight processing, you'll have to find something else to do while the ColorFast takes over your Mac. Still, there is some good news. According to GCC, a ColorFast driver upgrade, which should be available by the time you read this, will enable the film recorder to print in the background.

The Most Improved Player award in the speed category goes hands down to Mirus. When we last reviewed film recorders ("From Screen to Slide," July 1989), the Mirus FilmPrinter was dubbed "the slowest of them all." This time, however, we were impressed by how quickly the FilmPrinter Turbo II printed slides; frequently, the Mirus recorder came in second or third in our speed tests. Mirus has completely redesigned the film printer's digital processing mechanisms, and it shows.

In general, the Lasergraphics film recorders—particularly the newer Personal LFR and LFR Mark II models—performed extremely well in our speed tests. When attached to a Lasergraphics RISC Rascol—an optional controller that off-loads image rasterizing from the Mac—any of these recorders is unbeatable (see "Slide Maker Speeds").

In some cases, though, the RISC Rascol slows down print jobs slightly. The Mark II rasterized and printed a large Photoshop graphic in 3 minutes and 14 seconds without the RISC Rascol and in 3 minutes and 40 seconds with the RISC Rascol. The reason is that a scanned image, such as the one we printed from Photoshop, is rasterized by the computer during the scanning process; thus, sending that image through the RISC Rascol's rasterizing process adds an extra step.

The RISC Rascol isn't cheap—the base unit is \$5995, while the RISC Rascol Plus (due out by year's end), which has an embedded PostScript driver, is \$9995. But if you regularly need to crank out slides in a hurry, there's no better way to do it.

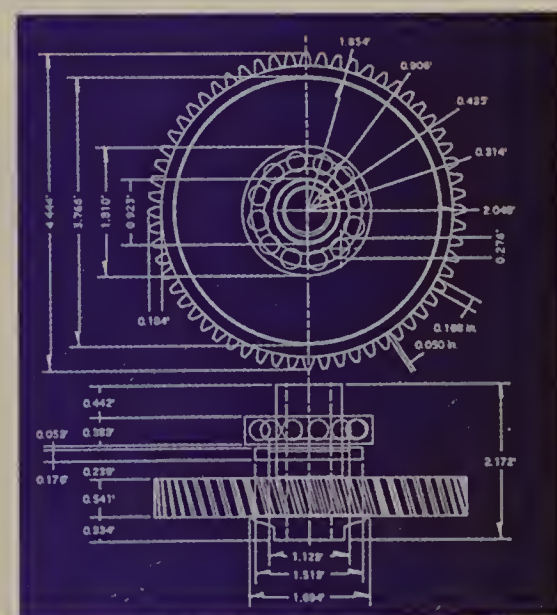
Image Quality

HELPFUL HARDWARE AND SOFTWARE controls and lightning-fast speed don't add up to much if the images a film recorder captures aren't presentable. Most of the film recorders we evaluated delivered slides suitable for a boardroom presentation, yet none of the recorders passed every test with flying colors.

To determine how smoothly a recorder handles color transitions, we created a number of slides with gradient-filled color backgrounds. Ideally, gradients should blend from one color to another without noticeable steps (or *banding*), but every film recorder we tested generated at least one gradient slide with some banding. In an effort to eliminate or minimize banding, some manufacturers have increased their film recorders' number of resolvable colors by representing each color with 33 bits or 36 bits instead of 24 bits.



Pink, White, and Yellow The slides we printed on GCC's ColorFast, using the recommended Polaroid film, all came back with a distinctly yellowish cast. Compare the color tones in the Photoshop image at top, printed on the ColorFast, with the image above, output on the Agfa PCR II.



Drawing a Fine Line We used this Canvas 3.0 sample image, with all of its hairlines, to test how the film recorders could handle fine-line resolution. Among the film recorders we tested, Agfa's PCR II did best in resolution testing. With most of the film recorders we tested, the hairlines in the center circle were slightly fuzzy. Agfa's PCR II did the best job on this test—the lines came out crisp.

Aside from testing banding, our slides were designed to test a film recorder's *resolvability*, the ability to produce thin lines and curves, and *color control*, the ability to handle color saturation and balance (and avoid such problems as blooming). We also took note of how well the recorders reproduce fonts. All of the models we

tested come with their own fonts and also support Adobe Type Manager and TrueType fonts; we noticed little, if any, resolution problems with fonts.

Slides from GCC Technologies' ColorFast were the most perplexing. We shot two rolls of the film GCC recommends—Polaroid Presentation Chrome 100—selected the appropriate color lookup table, and otherwise followed the manual's instructions, yet every slide had a yellow tint (see "Pink, White, and Yellow"). We shot another roll of film, Kodak Professional 200, and our slides came back with the proper color balance (the resolution wasn't as sharp, however). When contacted, GCC said it hadn't heard of this problem before but suggested the cause might be the developing process or using outdated film. We used the same professional developing house for all of our film, however, and this problem occurred only on the two rolls of Polaroid film we shot on the GCC; also, the film we used was dated April 1993. Conclusion: Who knows? It's simply one of those head-scratching experiences film recorder users are likely to encounter.

GCC slides also showed signs of blooming—the RGB test slide contained a thick yellow transition line between areas of red and green. While the ColorFast wasn't the worst offender when it came to banding, there were noticeable steps in the black-to-white gradient test slide. (Although few people will create them, slides with black-to-white gradients put a film recorder to the ultimate banding test, because the range of colors be-

tween black and white is wider than the range between other colors.)

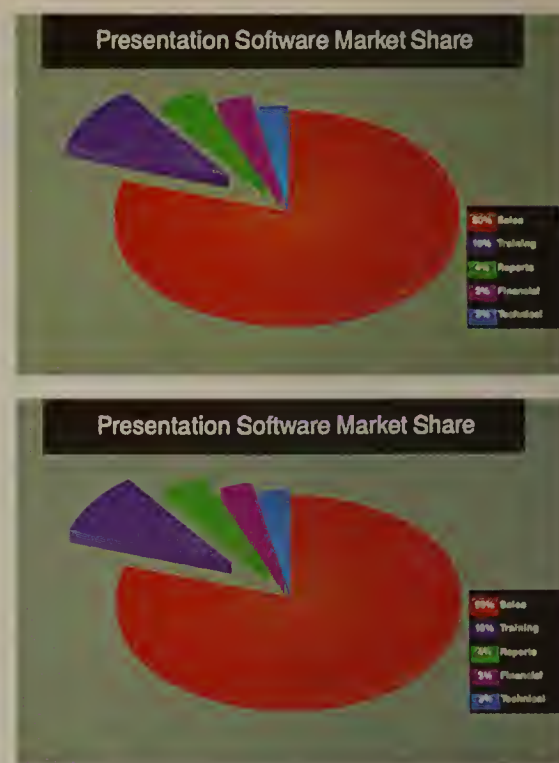
Another disappointment was the General Parametrics Spectra Star: the blooming test revealed a thick yellow line; banding was quite noticeable in several gradient test slides; and while resolution quality was a notch above that of the GCC, some of the Spectra Star's colors looked washed out.

Agfa's ProColor Premier fared well in resolution tests, thanks to the unit's large (7-inch) CRT and small (0.1mm) CRT dot size (typically, the larger the CRT size and the smaller the dot size, the better the resolution). The text was sharp and the colors rich and balanced. The ProColor loses points for banding, though, which was noticeable in the black-to-white gradient test slide, among others. We also noticed *ghosting*, or blurring, on the ProColor's fine-line resolution test, but adjusting the film recorder's pacing eliminated the problem.

The Mirus FilmPrinter Turbo II, which is only about \$500 more than the ProColor Premier and supports 36-bit resolvability, did a much better job controlling banding and blooming than did the Agfa recorder. In the black-to-white gradient test, the Mirus slide showed no signs of banding. The Mirus's biggest weakness is its handling of fine resolution (its CRT size is 2.4 inches, the smallest of the lot). On a test slide with a number of small white lines, the FilmPrinter was unable to correctly print the lines, some of which are curved, smoothly.

All three Lasergraphics film recorders performed well in our quality tests. In terms of resolution, the LFR Mark II, with a 6-inch CRT and 0.027mm tube dot size, was bested only by Agfa's PCR II recorder—text was especially clear, even at small point sizes, and fine black lines maintained their identity, rather than blurring into a single thick black line, as was the case with the Mirus FilmPrinter Turbo II. There were some instances of banding (see "Banding Exposed"), but for the most part, banding and blooming were minimal. Surprisingly, the quality of slides made from the lower-cost LFR was only incrementally inferior to those made from the top-of-the-line Mark II when observed under a loupe; and the Personal LFR, in turn, created slides that weren't markedly lower in quality than the LFR's.

Agfa's new PCR II became the standard by which we judged film-recorder output quality. Boasting a 7-inch CRT, a tiny (0.037mm) CRT dot size, and 30-bit resolvability, the PCR II's slides excelled in resolution quality. Text in 10-point type and relegated to corners (where it's most difficult to obtain good resolution, due to



Banding Exposed The chart at top reveals a classic example of banding: look closely and you'll see rings inside the slices (particularly the purple slice). The rings are present because this 2K slide doesn't contain enough color data to smoothly resolve the image. At 4K resolution (above), the slide takes longer to print, but the banding is eliminated. Both were printed on the Lasergraphics LFR.

the slight curvature of most cathode-ray tubes) showed up dressed to kill. The film recorder wasn't free of imaging problems, however; on our black-to-white gradient test, the PCR II slide showed noticeable banding, and only by adjusting the pacing (which slowed the print time by 20 percent) were we able to bust the ghosting out of the fine-line resolution test.

Dedication Is Required

THE QUALITY OF SLIDES GENERATED from a Macintosh has vastly improved since the days C. H. Banks and his colleagues snapped slides of ImageWriter printouts, but the process of making those 35mm images has become much more complex. Think of it as a cross between color printing and professional photography—that is, a task that requires a certain level of skill and knowledge. If you're going to spend the money on a film recorder, go the extra mile and dedicate a staff member, trained in graphic arts, to the task of creating and printing slides. If that isn't possible, then you should ask yourself if you wouldn't be better off sending slides out to a professional service bureau. After all, what's most at stake in a business presentation is your company's reputation; why squander it just to save a little money or time? **m**

See *Where To Buy* for contact information.

Macworld Lab testing supervised by MARK HURLOW.

MW

EDITORS' CHOICE

High-End

LFR Mark II When you combine this model with Lasergraphics' RISC Rascol, you've got an extremely fast and flexible film recorder with high-quality, reliable output. **Company:** Lasergraphics. **List price:** \$14,995 for Mark II; \$5995 for RISC Rascol.

Midrange

PCR II If getting the sharpest slides possible is a main concern, the PCR II is your best choice. The fact that it works with an optional Adobe PostScript RIP is a bonus for service bureaus. **Company:** Agfa Corporation. **List price:** \$13,500.

Low-End

FilmPrinter Turbo II This is the best film recorder for those on a budget. It's fast and easy to use, doesn't take up much desk space, and offers reliable results. **Company:** Mirus Industries Corporation. **List price:** \$7995.

Reviews

IN THIS ISSUE: Alias Sketch, Vicom Terminal Emulator, TelePort/FullFax, IBM LaserPrinter 10A, Just Grandma and Me, ALSoft Power Utilities, Think Pascal, TouchBase, Magic, and more

Color Paint Software

Fractal Design Painter 1.2

PROS: New Wet Paint layer; records and plays back brushstrokes; 26 new paper textures. **CONS:** Insufficient fill tool and gradation options; problems with Undo command. **COMPANY:** Fractal Design Corporation (408/688-8800). **REQUIRES:** Mac II; 2.5MB of RAM; hard drive; System 6.0.5; 32-bit QuickDraw. Recommended: 4MB of RAM; pressure-sensitive tablet; 24-bit video board. **LIST PRICE:** \$349.

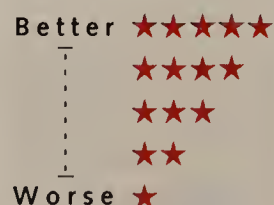


REVIEWED IN *MACWORLD* AS RECENTLY as February, Fractal Design Painter already has a substantially improved upgrade with a bounty of much-needed features.

Painter's most exciting new tools are four watercolor brushes, which paint on a special Wet Paint layer. Until you fix the watercolor to your painting by saving the current file or choosing the Dry command, you can edit the image on the Wet Paint layer independently of the rest of the painting. You can also modify brushstrokes on paint that has already been laid down in the Wet Paint layer.

To automate the painting process, Painter now offers a built-in macro feature. After recording a single brushstroke, you can apply it using any brush tool or color by merely clicking on the painting. If you prefer, you can instruct Painter to automatically fill a selected area with random strokes.

The new paint bucket tool has an enormous pal-



ette of fill options, but it still lacks some capabilities found in Adobe Photoshop's fill tool. For example, in Painter you can fill an area of contiguous color, but you can't specify the tolerance (selected range of related colors) of the tool, nor can you antialias the boundaries of the fill so it blends in with surrounding pixels.

You can fill an area with a gradation, but this feature is also unsophisticated. You can select from eight angles to determine the direction of the gradation, but you can't enter an angle value of your own. Nor can you fill an area with a radial gradation; Painter only permits linear gradations.

One of Painter's most interesting enhancements is its expanded collection of paper textures, including extraordinary surfaces such as long-grain rice, caviar, and a basketball's bumpy skin. Painter

also lets you scale a texture, which makes the grains appear larger or smaller, and adjust the depth of the grains to make the texture rougher or smoother. Painter 1.2 provides a Paper Mover, which lets you open texture libraries, transfer textures between them, and rename textures. Unfortunately, you still can't create a surface texture of your own.

Painter has bolstered its frisket (masking) capabilities in version 1.2. You can resize a frisket, although you still can't draw one that's geometric. You can also diffuse the edges of a frisket using the Feather option. Finally, you can now apply most of the commands under the Edit menu to a masked area just as if the frisket were a selection. One exception is the Rotate command, which lets you rotate a floating selection numerically but is not applicable to friskets.



Paint with the Pros Among Fractal Design Painter 1.2's new features are watercolor brushes (upper right), and a paint bucket tool that you control using options in the Fill Palette. The image on the left was drawn entirely with the mouse.

Painter isn't perfect. The Undo command isn't as sensitive as it should be. For example, you can't undo a change made to the boundary of a selection or of a frisket. I also met with a bug that deletes the contents of a previously selected area when you choose the Undo command. But these minor complaints aside, Painter 1.2 provides the best painting tools of any Mac application. Combined with Photoshop or ColorStudio, Painter easily satisfies the needs of the electronic artist.
—DEKE MCCLELLAND

3-D Illustration and Rendering Program

Alias Sketch 1.0.2

PROS: Draws in 3-D space; can use existing object as a plane; easily draws organic curves and extrudes objects; good editing tools and lighting controls; comprehensive surface-mapping controls; high-quality renderer. **CONS:** Reshaping isoparms does not account for caps; no text tool; does not support imported compound paths; no RIB support; slow wire-frame display; counterintuitive navigation tools. **COMPANY:** Alias Research (416/362-9181). **REQUIRES:** Any Mac II with 68882 math coprocessor; 8MB of RAM; System 6.0.5; 32-bit QuickDraw; hard drive. Recommended: Color monitor. **LIST PRICE:** \$995.



IN CREATING SKETCH, ALIAS RESEARCH built on its considerable experience with industrial modelers for workstations. There has been a deluge of bug reports, price complaints, and the eventual recall of version 1.0.1; but Sketch 1.0.2 emerged in February of this year substantially more stable and \$1000 cheaper. With drawing controls similar to Adobe Illustrator's and a free-form approach to three-dimensional graphics, Alias is making a home for itself in the crowded world of modeling and rendering software.

In most modelers, you edit 3-D objects from top, front, and side views. Sketch emulates three dimensions by letting you define perspective planes that constrain the creation or extrusion of a line or shape. So, for example, if you draw a rectangle on an active plane, the rectangle lies flat on that plane, like a decal affixed to a wall. A new drawing in Sketch opens to a single horizontal plane. Using the Plane tool, you can add planes that are parallel to, perpendicular to, or angled with respect to the active plane. You can even define the surface of an existing 3-D object as a plane, enabling you to exactly position other objects directly on its contours. For example, if you have already drawn a mountain range, you can add snowcaps that exactly conform to the rocky structure. Finally, you can affix a plane to an imported background image, perfect for architectural and environmental designers.

Drawing and Extrusion Tools

DRAWING A 3-D OBJECT IN SKETCH IS a two-step process. You first draw a line or flat shape on the active plane. Then, to give the object depth, you extrude the line or shape in a path along a different plane. To create a snake, for example, you draw an ellipse to represent the circumference of the body and then extrude it along a serpentine path; Sketch caps each end of the extrusion with the original shape, in this case, an ellipse. Lathing, which is similar to extruding, involves rotating a line or shape around an axis. To create a bottle, for example, you first draw a profile of the bottle and then use the Revolve tool to define the size and angle of the circular path around which Sketch will extrude the edge. The result is a radially symmetrical 3-D object. Both techniques are intuitive and flexible.

Sketch also uses a spline curve needed to enable you to draw organic curves, normally the exclusive realm of 2-D illustration programs like Illustrator and Aldus FreeHand. As is the case with the popular 2-D Bézier-curve tool, the way you create points in Sketch determines the appearance of the line segment you create; if you place one point, then click to place a second, you get a straight line segment; clicking and dragging to place the second point creates a spline curve; option-dragging gives you an arc of a circle. The same controls apply to extrusion paths. Though less precise than true Bézier curves, in which a floating handle determines the curvature of a segment as it enters or leaves a point, Sketch's spline curves represent a dramatic improvement over the polygons that pass for curves in most modeling programs.

Sketch also has exemplary editing tools. When you create a 3-D object, Sketch creates a series of *isoparms*, which are cross sections of the extruded or lathed object. You can select any isoparm independent of the rest of the object and move, scale, or rotate it; Sketch updates the object accordingly. You can even reshape an isoparm by adding points, moving points, and changing the curvature of individual segments. Unfortunately, Sketch doesn't account for the cap when you reshape an extruded object, so that if you manipulate an isoparm close to either end of a 3-D object, end and cap may no longer jibe. The only solution is to reshape the cap by hand.

Sketch's biggest shortcoming as a drawing package is its lack of any form of text tool. In fact, the only way to include text in Sketch is to enter it in a program like Illustrator, convert the text to graphic objects, and export the file to the EPS format. You can then import the EPS image into Sketch, extrude the text, and even reshape the characters if you want. Note, however, that Sketch does not support compound paths—objects with holes cut out, like the letter *O*—so if you want to extrude such a letter, you have to first trace it as a single outline.

Renderer Included

SKETCH COMES WITH ITS OWN RENDERER—a good thing, since the program doesn't support RIB, Pixar's widely supported rendering standard. Built-in rendering controls include lighting, surface mapping, curve and render quality, ray tracing, and shadows. Sketch provides spotlights to illuminate specific objects and point lights for general ambience. You can position a light anywhere in space, point it at a specific object, and specify its intensity, decay, drop-off, and color, just as in a dedicated rendering program.

Sketch has remarkably comprehensive surface-mapping options. You can color an object, assign a surface from an online library of 36 materials, or import a custom surface saved in PICT or TIFF format. You can also specify the levels of transparency and reflectivity to be applied to surfaces. You can then name the surface and store it for future use. You can also assemble and name render settings. Sketch's default Photo-Realistic setting, for example, includes both ray tracing and shadows, two time-intensive rendering attributes that greatly enhance the realism of images.

During the rendering cycle, Sketch displays the image-in-progress on screen so you can monitor the rendering as it occurs. The on-screen image is your only

continues

guide to total rendering time, since Sketch offers no estimate; you can see how much of the image is rendered, figure out how much time has passed, and guess how much time is left. As with other 3-D packages, if you don't like the way an image is being rendered, you can cancel the operation. Under System 7, you can render in the background (with significant slowdown of foreground activities).

Navigating with Turtles

SKETCH'S BIGGEST DRAWBACKS ARE quirky navigation and sluggish performance. Working in three-dimensional space on a two-dimensional display is necessarily complicated. But Sketch doesn't help the matter any with its omission of an autoscrolling feature—it doesn't even have scroll bars. Inexplicably, you can scale the window only proportionally, so if you use a full-page monitor, half of your work space goes wasted. I struggled with adapting to the Z'PR (pronounced like *zipper*) tool, which lets you zoom, pan, and roll an image inside the window. Once I got it, I found the Z'PR useful, but surely a standard Macintosh zoom tool would help users get over the learning curve a little more quickly. In terms of speed, Sketch needs some work. You can increase the display speed by lowering the accuracy of curves in the wire-frame mode, and you can even temporarily hide objects that you don't need to see for the moment. But as your work becomes more complicated, the lethargic speed of the modeler becomes a nuisance.

Still, I am very impressed with Alias Sketch. Despite its first-version failings, its unique collection of tools makes it the only program on the market that lets you sit down and play with 3-D modeling. I've yet to see another modeler that's this easy to pick up. In less than an hour, you can create an object like a bottle or a piece of furniture and start rendering it on screen. Sketch trounces other modelers (with the possible exception of Ray Dream Designer, from Ray Dream) at creating natu-

ralistic curves and fluid images. Sketch may prove to be the turning point that finally brings many two-dimensional artists into the more versatile world of three-dimensional space.—DEKE MCCLELLAND

Communications Software

Vicom Terminal Emulator

PROS: Supports multiple simultaneous sessions; includes parser tool, for reformatting data, and data-scope developer tool. **CONS:** Spartan emulation environment; lacks many U.S. modem configurations; complicated development tools. **COMPANY:** AM Computer Technology (The Fisher Group, distributor; 714/597-1123). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0. **LIST PRICE:** Connect320 \$195; Connect340 \$245; MultiTerm320 \$295; Pro (includes Connect320 ten-pack) \$3500.



THE BANE OF CORPORATE INFORMATION users is the need for a deskful of terminals to communicate with a company's mainframe computers. Terminal emulators alleviate hardware clutter, but end users still face the intimidating mainframe interface. Vicom's terminal emulators aim to solve the interface problem with programmable front ends.

The entry-level Connect320 package provides basic emulation for TTY, ANSI, VT100-320, DG2111, Adds VP50, and CEPT1/2 terminals. An optional upgrade, to Connect340, adds emulation for VT241 and VT340 with color ReGIS graphics. The basic package also supports Xmodem, Ymodem, Zmodem, and Kermit file-transfer protocols, and can execute (but not create) macros, scripts, and user-interface front ends. With MultiTerm320 you get the ability to build macros (scripts) and custom user interfaces. High-end Vicom Pro adds VIP-7800 emulation and the SuperScript language for sophisticated script control down to the protocol level.

Unique to the Vicom line is the ability to run multiple sessions simultaneously over separate connections, via the Mac's built-in serial ports and over a network using Apple's Communication Toolbox. This is handy in corporations, where multiple connections to one or more host systems are common.

As terminal emulators go, Vicom is Spartan. A vertical icon bar provides a one-step connect button, access to configuration dialog boxes, and miscellaneous functions. A horizontal button bar lets you control common terminal functions such as character echo, Xon/Xoff, session recording, and text buffering. The user can

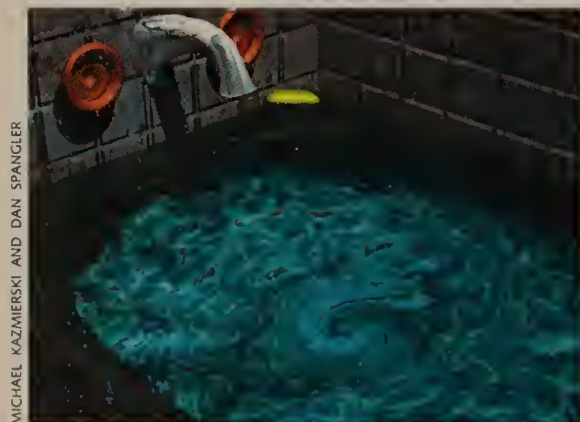
neither customize the icons and buttons nor create custom macros or scripts. Vicom's British heritage shows in its preconfigured modem set: many popular U.S. devices such as those from Telebit, Practical Peripherals, and Zoom Telephonics are missing. Worse, you can't define your own modem configurations; if Vicom doesn't have your configuration and it deviates much from Hayes standards, you're out of luck. The only relief from Vicom's bare-bones emulation environment is its built-in parser tool, which lets you slice downloaded text files into rows and columns for extraction—very handy for ad hoc data capture. However, the lack of user scripting limits the end user's ability to automate this feature.

Midrange MultiTerm320 comes with a macro facility, provides basic scripting, and has an interface editor that lets you modify the icon bar and add buttons and menus. The macro language lacks a key feature: automatic script writing. Virtually every other Mac communications program lets you generate scripts by example; you perform whatever procedure you wish to automate (such as sign-on), and the program builds a script to replicate the procedure. With MultiTerm320 you must enter script commands manually, a tedious and error-prone process. Vicom stores macros in text files whose syntax must be checked separately, whereas other Mac products provide interactive script entry and error checking.

Macros run directly via the Macro command, or via a custom button or menu item created with the interface editor. The menu editor also lets you customize menu bars and menu items, but it doesn't support hierarchical menus.

Vicom Pro adds text boxes and scrolling lists to the interface editor, along with a far more comprehensive (and complex) scripting language called SuperScript. I did not receive the SuperScript manual for evaluation, but the company sent me examples showing that SuperScript can implement such low-level facilities as file-transfer protocols and data translators. A built-in data-scope utility lets you observe low-level data traffic in both ASCII and hexadecimal, which is nice for debugging. However, the complicated SuperScript language and Pro's hefty entry price make it practical only for preparing canned functions for use by large numbers of users.

If you're in a large corporate MIS department with programmers to spare, or if you need device emulation and multi-session capability, the Vicom family might be useful. But for many environments, products such as MicroPhone are cheaper and easier to use.—MEL BECKMAN



A Whirlpool Drawn in Sketch and rendered in 54 hours, this artwork integrates shadows, ray tracing, and the highest image-quality settings.



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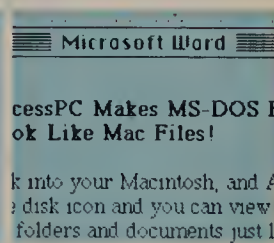
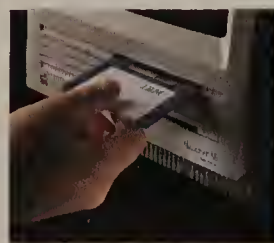
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Circle 235 on reader service card

TelePort/FullFax

PROS: Frees modem port for other uses; MNP Class 5 compression; automatic power-up; voice/fax switch; fax send/receive; fax autoprnt. **CONS:** Quirky fax enveloping; receiving faxes slows foreground operation; no partial resend. **COMPANY:** Global Village Communication (415/329-0700). **REQUIRES:** Any Mac with ADB port. **LIST PRICE:** \$295.



AFTER MORE THAN EIGHT YEARS, every Mac still ships with two serial ports. In 1984 this seemed like a luxury; in 1992, it's a limitation. Modern Mac power users wanting to connect modems, label printers, bar-code readers, and other serial devices soon find themselves wanting just one more serial port.

Two years ago Global Village came out with the TelePort, a 2400/4800-bps data/send-fax modem connected to the Mac's ADB port, freeing one serial port for other uses. Global Village's innovative successor, the TelePort/FullFax, adds 9600-bps fax send-and-receive capability, and significantly upgraded fax software.

You simply plug the tiny, lightweight modem's cable into the ADB port (the cable has a built-in Y-adapter so you don't lose an ADB port in the process) and plug a modular phone jack into one of the modem's two phone jacks. You can plug a telephone into the remaining jack. New features include a built-in speaker and a voice/data switch that lets you automatically toggle a single phone line between voice and fax operation.

The data portion of the TelePort/FullFax is identical to its predecessor. There are no external switches or status lights on the modem; instead a pull-down menu and status indicators in the Mac's menu bar simulate them.

The software includes a Control Panel device (control panel for System 7 users) that lets you connect either Mac serial port to the modem by clicking on the appropriate connection, and a built-in F-key that acts as a software A-B switch. This arrangement works well—power users find the F-key handy, while casual users can stick with the intuitive cdev. No manual switching is necessary when using the fax send or receive features.

The fax software contains major enhancements. You still send a fax by holding down the option key and printing from within an application, but the fax address book is much improved, supporting multiple address files, address groups for

fax broadcasts, delayed transmission, and import/export data exchange with many popular stand-alone address-book data formats. You can now choose multiple destinations for ad hoc broadcasts.

Transmissions take place in the background, so you can continue working in other applications. A menu-bar display tracks progress page-by-page. An automatic error-recovery feature tries to retransmit the document a predetermined number of times if an error occurs. Unfortunately, there are no provisions for resending partial documents without reprinting the fax images from the originating application.

The TelePort/FullFax can automatically answer the phone and receive faxes, or receive faxes manually. In automatic mode, it can power up Macs that have a keyboard power switch to answer incoming calls. The TelePort/FullFax even automatically prints incoming faxes. Receiving and printing, like sending, occur in the background. However, receiving significantly slows response time in the foreground application, and compute-intensive foreground tasks sometimes cause fax reception to fail.

The built-in voice/fax switch works with a telephone or answering machine connected to the modem's second modular telephone jack. When you (or the answering machine) answer an incoming call, the TelePort/FullFax listens in. If it hears a fax machine's Guard Tone, the TelePort/FullFax disconnects the telephone or answering machine and enters fax-receive mode.

The FaxCenter application lets you reschedule, view, and print faxes, using folder icons to represent incoming and outgoing faxes. You schedule faxes for transmission by dragging them to a folder named Scheduled, while incoming faxes appear automatically in a Received folder. You can envelope (combine) faxes, or forward received faxes to another location. Unfortunately, the enveloping feature inconveniently strips off cover pages, with no provision to add a new cover page.

You click on a Clipboard icon to view the fax-activity log, which records every fax transmission and any errors that might occur. Similarly, you drag incoming or outgoing faxes to the fax software's trash can icon to delete them, although the lack of confirmation or retrievability makes this feature dangerous.

Overall, the TelePort/FullFax is solid and reliable. Its ADB connectivity fills a useful niche in the Mac marketplace, while the compact design and lack of external power requirements make the TelePort/FullFax useful even as a modem for PowerBooks.—MEL BECKMAN

IBM LaserPrinter 10A

PROS: Outstanding 600-dpi output; multiple darkness settings; includes printer utilities for System 6 and 7; quiet operation. **CONS:** Large, awkward design; can't be used by PCs over a network; slow on large PostScript files. **COMPANY:** Lexmark International (800/358-5835). **REQUIRES:** Mac Plus; hard drive. **LIST PRICE:** \$3995.



SOMEHOW I HAD A FEELING IT would go this way. IBM finally breaks into the Mac market with a laser printer designed specifically for the Mac—no special cables, adapters, or optional AppleTalk interfaces needed—and wouldn't you know it, the thing *isn't PC-compatible*.

Lexmark, the company that now builds IBM's typewriters, computer keyboards, and printers, is aiming solely for the Mac user with its LaserPrinter 10A, an impressive, easy-to-use PostScript printer that offers dazzling 600-by-600-dots-per-inch resolution—for under \$4000.

This isn't the fastest printer around. Though the print engine is rated at a zippy 10 pages per minute, it's driven by a 16.7MHz Motorola MC68020 processor—one of the slower processors being used in current page printers. You get 10-ppm performance on simple text documents, but add some complex PostScript graphics files and things definitely bog down. Fortunately, the gorgeous output is usually worth the wait.


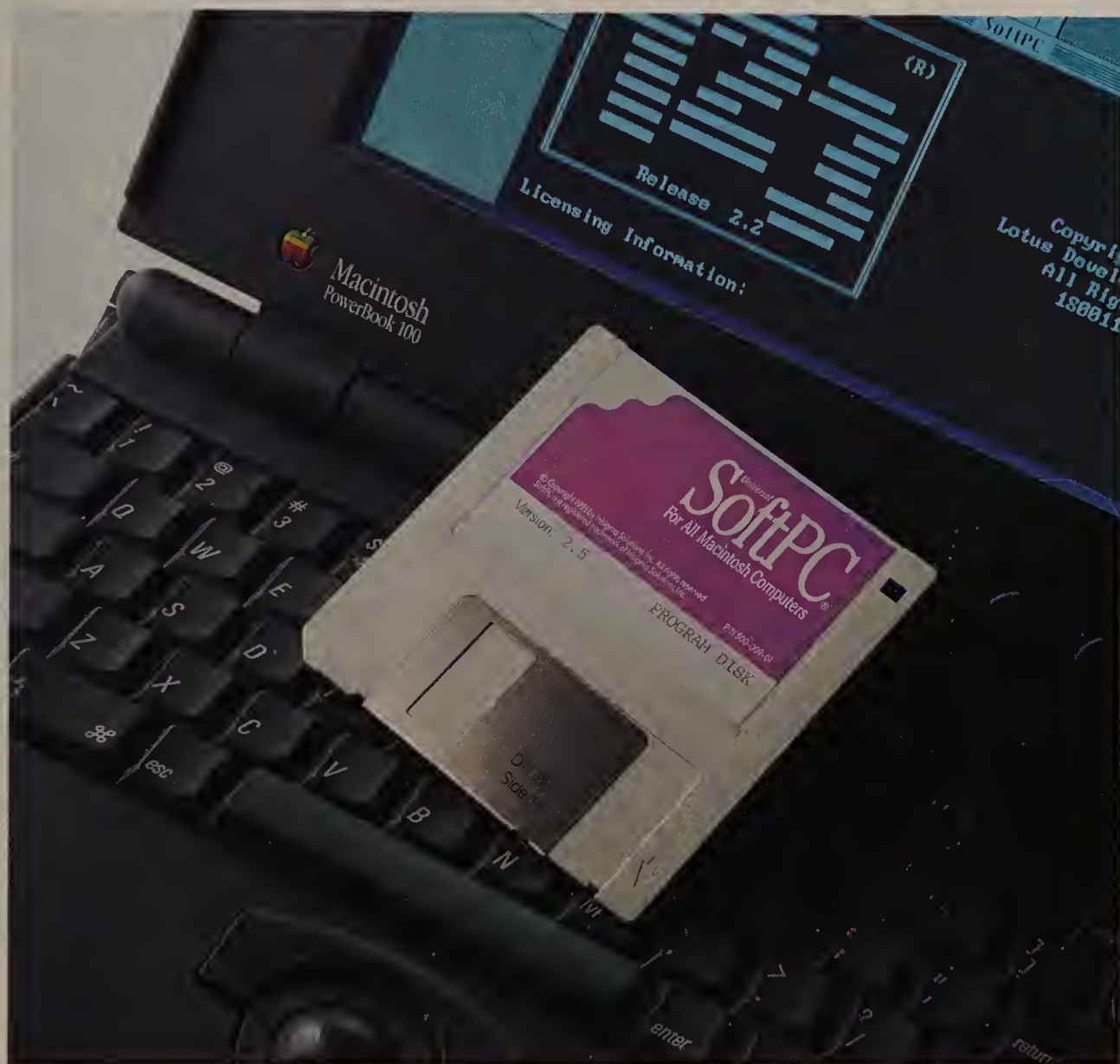
At 600 dpi, the IBM LaserPrinter 10A produces beautifully defined text, razor-sharp line art, and extraordinarily clear gray tones. And because this is a true 600-by-600-dpi printer, the output is of superior quality on both vertically and horizontally oriented documents.

When used in 300-dpi mode, the printer also offers a text-smoothing feature called Print Quality Enhancement Technology (PQET). Actually, the enhancement technology doesn't make much of a difference on smaller fonts, but it noticeably improves the appearance of fonts that are 18-point or larger.

Print quality can be enhanced by choosing among three darkness settings in the printer's control panel. The Normal setting is fine for general text printing, but on graphics jobs, choosing the Light setting produces finer line widths, higher definition, and a wider, smoother range of grays. I also found that choosing the Light setting when working with tiny fonts did more to improve resolution than activating

continues

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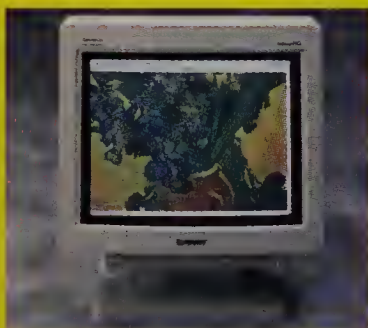
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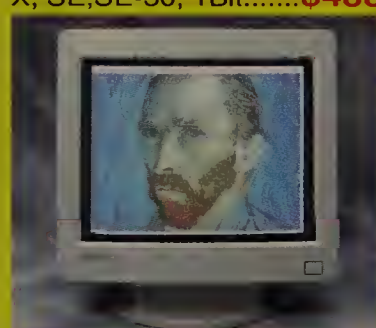
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ing PQET. The Dark setting yields bold print and dark grays.

Getting started with the 36-pound 10A is extremely simple. The unit ships with the print cartridge preinstalled, so all you have to do is plug in the printer, connect it to the Mac with a LocalTalk cable (not included), and power it up. The printer comes with 39 PostScript fonts and 5MB of memory, upgradable to 9MB.

The IBM LaserPrinter 10A is remarkably quiet. After revving up briefly at start-up, the printer idles with a barely discernible hum. A power-saver feature lets the printer snooze in near-silence when not in use.

Unfortunately, the 10A has a few awkward design features. Paper trays, exit bins, and feed guides protrude from both ends of the unit, stretching its total length to a space-robbing 30 inches. Part of the problem is the front exit tray, which adds 8 inches to the printer's length and has a holding capacity of just 20 pages. (Fortunately, it's removable.) Likewise, the printer interface box juts out 3 inches from the back and is flimsy, making it highly susceptible to bumps and jolts.

The 10A has an outstanding eight-button control panel. Status messages appear on the clearest, brightest LCD read-out I've ever seen, and the menu structure is logical. For manual feeding, there's a smartly designed adjustable paper guide that allows you to keep manually fed sheets properly aligned. The top exit bin has a 250-sheet capacity and a sensor that automatically causes printing to pause when the bin becomes full.

The manual is completely Mac-oriented, with just a few odd deviations (menus, for example, are called pull-downs). Printer utilities for System 6 and 7 come with the printer and include a convenient desk accessory that lets you adjust print resolution, activate or disable PQET, and select the paper source (when auxiliary trays are installed) for print jobs.

Replacement print cartridges for the 10A cost \$199 and yield about 10,000 pages. Lexmark also offers a high-yield cartridge with a life of 15,000 pages for \$259. Other accessories include a 500-sheet second paper tray (\$449), a 75-envelope feeder (\$379), and a heavy-duty label/card stock tray (\$69).

Some popular page printer features are lacking here: there is no SCSI port option for adding a hard drive to the printer; and, as mentioned, PC emulations are not available for the 10A, making it unsuitable for networks that include both PCs and Macs. But if you have a Mac-only office, and have less than \$4000 to spend for 600-dpi resolution, the LaserPrinter 10A is the obvious pick.—JOSEPH SCHORR

Distributed File Server

DataClub Classic 2.0 DataClub Elite 2.0

PROS: Admin application provides load statistics; Elite allows multiple servers to appear as one server; can administer servers remotely. **CONS:** Access to files depends on Macs being accessible; server cache can require more than 500K of hard drive space. **COMPANY:** Novell (801/429-5533).

REQUIRES: Mac Plus; 4MB of RAM for dedicated server; AppleTalk network; System 6.0.2. **LIST**

PRICE: DataClub Classic three-pack \$395, ten-pack \$795, single packs \$175; DataClub Elite \$1395.



DataClub Classic 2.0



DataClub Elite 2.0

PRIOR TO THE INTRODUCTION OF System 7, networked users had to choose between DataClub and Sitka's TOPS if they wanted to use a distributed file-sharing system. Even with the introduction of System 7's File Sharing option, DataClub still stands out as the only fully distributed file server, making file sharing as transparent as possible to the user.

DataClub is available in two configurations: DataClub Classic and DataClub Elite. DataClub Classic's main feature, originally found in DataClub 1.0, is background file sharing. DataClub Classic supports System 6.0.X and System 7.0.X.

DataClub Elite's gateway feature allows non-DataClub users to access a DataClub user's Mac (originally available in DataClub 1.0) and now supports a dedicated file server, which makes DataClub a direct competitor to Apple's own AppleShare file server.

DataClub Classic

DATA CLUB CLASSIC IS AN INIT (AN extension in System 7 parlance) that allows DataClub users to pool the free space on all of their hard drives into one virtual server. Users can then create folders of new files on the DataClub virtual server, and the folders are stored on whichever hard drive has sufficient space. The user doesn't know (or care) where the files are stored. The files are available to the user as long as the user's Mac and the Mac storing the files are running and connected to the network. You can't ask for a more transparent means of storing and sharing files on a distributed network. One problem with the distributed approach is that when a participating Mac disconnects from the network, users lose access to the files stored on that Mac.

Since DataClub is compatible with the AppleTalk Filing Protocol (AFP), any DataClub folder can have the same read, write, and delete privileges that an AppleShare folder would have. To find out where a folder is stored, you use the Mac's Get Info command. Should you want to move the file, you select a new location from the Get Info window's pop-up menu of available drives. DataClub then transfers the folder and its contents to the selected hard drive.

Although I didn't run into any performance problems using DataClub Classic, there are occasions when having many files on a DataClub drive will slow down your system. Keeping some files on your own hard drive can improve performance. Every time you create a folder using DataClub it can be saved anywhere on the DataClub server. If you regularly keep files on your drive, a DataClub preference allows you to create new folders on your Mac. If you jealously guard your hard drive space, but still want to share files, you can instruct DataClub not to allow other users to create folders on your hard drive. You can also have your DataClub administrator relocate folders for you using the DataClub Admin application. Since the DataClub Admin application displays the relative use (load statistics) of each hard drive that's a part of a DataClub server, the administrator can relocate folders to better distribute usage.

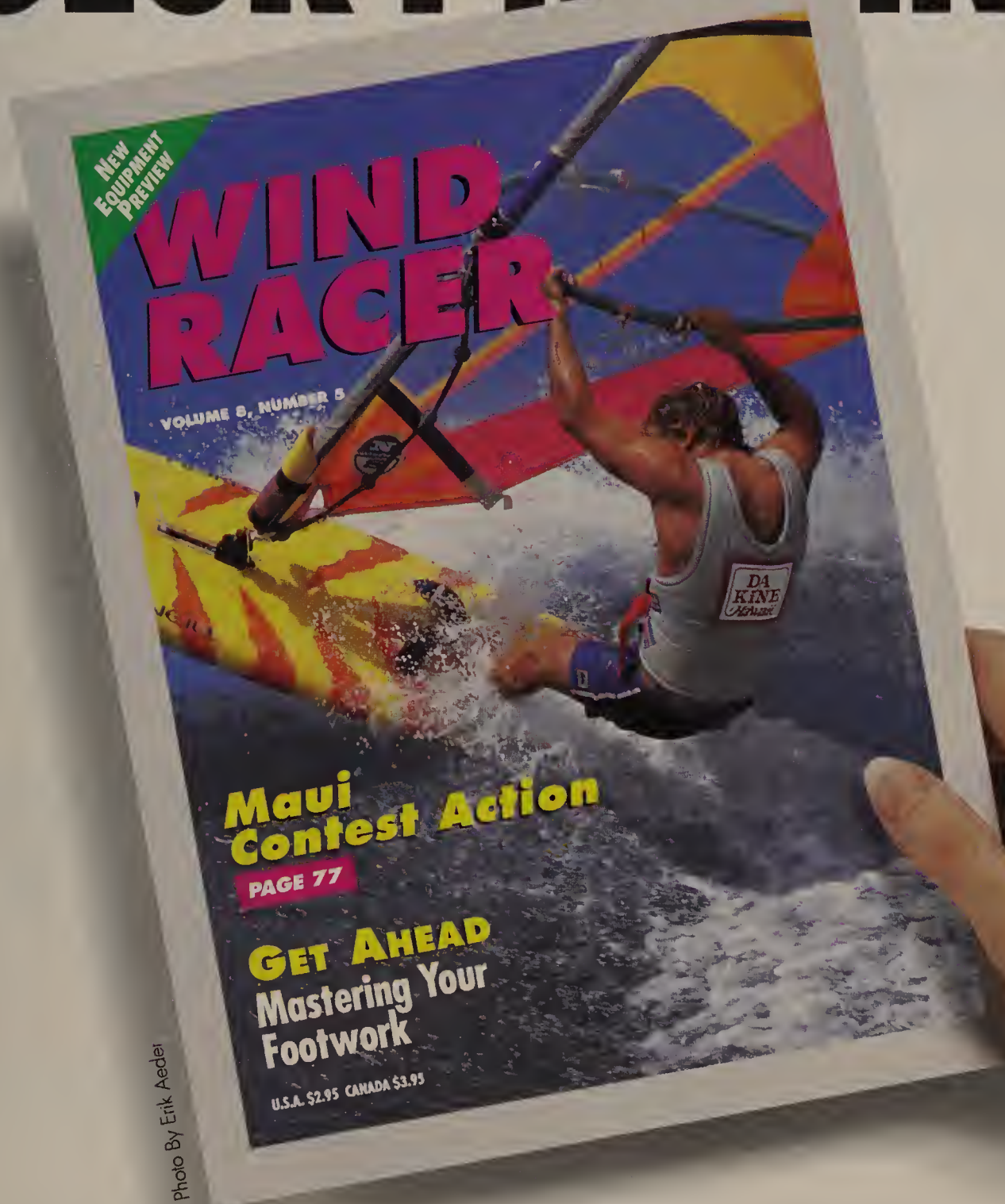
DataClub Elite

DATA CLUB ELITE, A NEW ADDITION TO the DataClub line, is designed to be a replacement for Apple's AppleShare server software.

One advantage of DataClub Elite is its ability to make multiple dedicated servers appear to the user as a single server. Even if you have a number of servers, each with multiple hard drives, the user sees only one server, a feature that simplifies access to the files stored on the different servers. Also, the DataClub Admin application for DataClub Elite can be used on any networked Mac, not just on the server, making it easier to manage multiple servers.

So if you want an easy way to store and exchange files, I recommend DataClub Classic—it makes networkwide file sharing a cinch. On the other hand, if you need the added security (for example, being able to physically lock up the server Mac) and reliability of a dedicated server (or multiple servers), take a look at DataClub Elite. Elite performs as well as Apple's AppleShare software and offers features that even AppleShare doesn't include, such as making multiple servers look like one.—DAVE KOSIUR

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22008R

Business-Analysis Software

PowerPlay 1.0

PROS: Multilevel data hierarchy is easy to navigate; graphs are easily labeled and colored. **CONS:** Limited range of graph types and arithmetic; no analysis tools; no free technical support. **COMPANY:** Cognos (617/229-6600). **REQUIRES:** Mac II; hard drive; System 6.0.4. **LIST PRICE:** \$695; technical support \$105 per year.



IT CAN BE FRUSTRATING TO BE A middle manager in a large company. The Mac on the desk provides millions of CPU cycles every second, ready to serve you, yet your firm's operating data remains tantalizingly just out of reach. Even if you're networked to the mainframe where the data resides, there's too much of it; plus it's hard to access, organize, and display.

PowerPlay is one of several recent products to address this problem. It offers small, manageable views of data and graphs and tabulates the views in several colorful ways. The program reads data from text files, which you must construct in very specific ways, since the structure controls access to the data. Usually these files are imported from large remote databases in the necessary

format. PowerPlay is designed to be one component of an overall approach to business information systems that include DOS and mainframe systems, yet the program can be useful by itself.

The data in PowerPlay is organized in a hierarchy in which each numerical value is labeled by several pyramiding categories. Say a single figure represents the sales results of one person, selling one color of one shoe style for March 1992. By climbing up the salesperson pyramid, you can display ever larger chunks—the sales office, the region. Navigate the merchandise pyramid, and you can display all colors of one shoe, then all shoes. The time pyramid lets you view the month, the quarter, the year, and so on. PowerPlay lets you focus on—or in the program's parlance, “drill down” to—different depths in many categories at once. Graphs and cross-tabulations permit you to compare items at any level of detail, such as relative sales of shoes in five different colors in each of three regions. This structure has drawbacks, since levels must be strictly nested. Do you show shoes of all colors for each size, or all sizes for each color? You can't have it both ways in the same database, as you could in a non-nested structure.

Pop-up menus allow you to easily navigate the hierarchy. Once you've drilled down as far as you want, you choose your display method. PowerPlay supports three-

way cross-tabs (rows, columns, and layers) and bar, pie, and line graphs. Legends automatically appear in a separate window. You can readily swap variables among rows, columns, and layers, and do the same on graphs by changing how you cluster or stack bars. When exporting displays via the Clipboard, PowerPlay adds a separate legend to indicate the level to which you have drilled down in each of the category pyramids.

PowerPlay's graphing ability is limited. The program supports three dimensions for categories, but it cannot display three dimensions; so, to chart sales by region, color, and size, you get several small graphs comparing color to size, one for each region. True *x-y* plots aren't possible. PowerPlay also lacks powerful tools for understanding data, such as histograms and boxplots. It has no facilities for data analysis, not even a logarithm for scaling plots. The arithmetic mean is the only summary provided.

PowerPlay's manuals and help stacks are generally well written and clear. Telephone help is available only by paid subscription.

Overall, this is a good program for a very limited range of tasks. For the price, I would rather buy Muse from Occam Research, which does a comparable job of organizing and graphing data but also has 3-D displays, manages eight dimensions rather than three, and manages the database as well.—PHILIP STEIN

Interactive Storybook on CD ROM

Just Grandma and Me

PROS: Fun for all ages; motivates kids to read. **CONS:** Hefty hardware requirements; may create family competition for computer time. **COMPANY:** Brøderbund Software (415/382-4400). **REQUIRES:** Mac II (also runs on LC); CD ROM drive; 4MB of RAM; System 6.0.7. **LIST PRICE:** \$49.95.



WHETHER YOU'RE A PARENT OR a child, you've undoubtedly been touched by Mercer Mayer, the award-winning author of hundreds of children's books. One of his best stories, *Just Grandma and Me*, has just been released as the premier title of Brøderbund's Living Books series.

Just Grandma and Me isn't the first interactive storybook. The Discis Books series has been available almost since the first Macintosh CD ROM drive shipped. With the Discis CDs, young readers can read illustrated stories on screen, clicking on pictures and unfamiliar words for pronunciations or definitions, or simply listen while the computer reads the stories aloud.

From Grandma's opening menu screen, it's clear that Brøderbund's first Living Book

is far more lively than any of the Discis Books. An animated Little Critter explains the main options out loud while pointing to two buttons. Then he dances to a spirited Latin tune until you make your decision.

If you click on Read to Me, each page displays in turn, highlighting the text as the critter-child's voice reads it. But the pictures don't just sit there; animation, dialog, and sound effects enhance the story.

If you choose Let Me Play, the story pauses after each page, to let you explore. Nearly every object responds to a mouse click in some unexpected way. The mailbox opens, water pours out, and a bullfrog hops away. A beach umbrella launches like a rocket and lands in the ocean. A starfish stands up, pulls out a top hat and cane, and does a soft shoe.

The graphics are charming, the animated sequences hilarious, the sounds life-like, the spoken words clear, and the totality is absolutely captivating. Even the older kids on my software testing team explored every nook and cranny of all 12 pages. Passing parents invariably got sucked in, too.

Everybody loved this program, but I was especially taken by Gabriel, a Peruvian-born two-year-old who was crying softly in his mother's arms when he noticed the colorful pictures on the screen. When the story started and the pictures came to life, Gabriel was hooked. Before long he was waving the



Blowin' in the Wind Once Little Critter's flight is over, the other objects on the beach come to life with a mouse-click.

mouse around, clicking on pictures and words, watching and listening to the results with every ounce of his attention. I wish Gabriel could have stayed longer so that I could have seen his reaction when the computer read the story in his native Spanish (the program also includes a Japanese narration). I hope he'll have lots of opportunities to play with this and other Living Books. Multilingual talking storybooks just might help him to find the courage to talk more.

But that's just hopeful speculation. For now I can only be sure that this first Living Book is a big hit with Gabriel, Alex, Anna Marie, and all the rest. The kids and I are delighted that more are on the way.

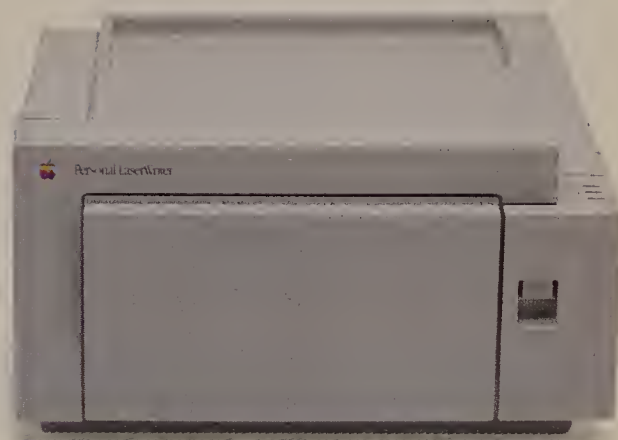
—GEORGE BEEKMAN AND THE SHOOBEDOO-BOP SOFTWARE TESTING TEAM

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Low-End Page-Layout Software

MacQuill 1.0

PROS: Inexpensive; easy to use. **CONS:** Lacks several common features such as word count and kerning; no import/export facility; weak documentation; occasionally buggy. **COMPANY:** Nest Software (408/441-1944). **REQUIRES:** Mac Plus; System 6.0.2. Recommended: Hard drive. **LIST PRICE:** \$149.



MACQUILL BY NEST SOFTWARE IS an integrated application combining word processing and page layout under one menu. Like most integrated applications, which attempt to merge the key virtues of several disparate programs, MacQuill comes up a little short when you compare its separate parts to their stand-alone counterparts.

As a page-layout program for serious publishing, MacQuill is rendered useless by the absence of basic features like kerning and the ability to import text files. As for word processing, absent are a few regulars like curled quotation marks and ¦-keys; if your daily composition involves more than simple correspondence, you're out of luck.

But if you are looking for a simple page-layout program at a very low cost, then

MacQuill is for you. Case in point: using MacQuill, I was able to create a newsletter in less than three hours, and the final output looked quite fine.

You work with MacQuill in two modes: word processing or page layout. Let's say you're creating a newsletter. Using the frame tool, you draw and place frames, which act as placeholders for graphics and text. Rulers on the top and left side of your document help you keep things straight. (Perfectionists will appreciate the ability to enter measurements in inches, centimeters, or points for precise frame placements.)

The Frame Link tool lets you link parts of a story into one. Frames can be linked so that text flows from one column to another on the same page, and across multiple pages (here's where MacQuill's two-page view comes in handy). For example, you can begin a two-column feature story on page one and finish it on the back page, as newspapers do. Frame-to-frame links are depicted by lines and arrows, even across pages, which makes tracking several stories easier to manage.

Once frames are linked, you switch to word processor mode to place your text and graphics. MacQuill lets you type directly inside a frame's dotted border, or you can paste in text copied from another document via the Clipboard. However—and this is a big however—there's no file-import func-

tion. Graphics are treated similarly: copy and paste from the Scrapbook or Clipboard. Text automatically flows around graphics that overlap text frames. This feature, plus the ability to apply multiple fonts and styles within each frame, make for reasonably-professional-looking publications.

MacQuill includes a built-in spelling checker and a well-executed Find function, which lets you search and replace text by font, size, and style characteristics. You can also create glossaries and styles, and place odd and even headers. The program performs quickly as a word processor, but slows down considerably in page-layout mode, but then, so do most page-layout programs.

Unfortunately, MacQuill has a couple of bugs and deficiencies. Page breaks often show up uninvited, and occasionally text simply vanishes (although scrolling usually corrects the problem). There is no word-count feature. Frame borders are limited to one thin weight. And finally, if you have aspirations of printing your newsletter at a professional printshop, forget about it; MacQuill does not export documents to popular formats.

But remember, MacQuill is targeted for "the basic Macintosh user." For this market, the sum of MacQuill's halfway-decent parts equals a friendly and useful program for simple word processing and grass roots publishing.—JOE HUTSKO

Utility Package

ALSoft Power Utilities 1.0.1

PROS: Economical bundle of DiskExpress II and MasterJuggler. **CONS:** Some utilities lack depth. **COMPANY:** ALSoft (713/353-4090). **REQUIRES:** Mac Plus (Mac II for ScreenEclipse); System 6.0.4 (7.0 for MenuExtend). **LIST PRICE:** \$129.



TO CREATE ALSOFT POWER UTILITIES, ALSoft first bundled its two most popular programs (unchanged from their stand-alone versions)—the disk optimizer DiskExpress II and MasterJuggler, a font, DA, sound, and application manager. Then ALSoft added five more utilities to round out the deal: MenuExtend, MultiDisk, DiskCheck, ScreenEclipse, and DiskFlash. Surprisingly, ALSoft Power Utilities doesn't overlap much with the other two most popular utility packages, Norton Utilities for Macintosh (\$149 from Symantec) and Now Utilities (\$129 from Now Software).

MasterJuggler has enough features to keep the most die-hard font and DA habitué happy. It works under System 6 and System 7 and enables you to access fonts, sounds, and F-keys without installing them in the

System file. It also lets you store and use PostScript screen and printer fonts in folders other than the System 7 Extensions folder. ALSoft's Font/DA utility combines the different PostScript screen fonts into one menu choice, so for example, you can access B Garamond Bold simply by choosing Garamond from the Font menu and bolding it from the Style menu. MasterJuggler also lets you have as many as 120 resource files open, including those on networked file servers. The FontShow feature previews fonts in a variety of sizes and styles. MasterJuggler also has an Application List from which you can launch and switch between applications and documents. You can assign sounds to different Mac events, such as ejecting disks, shutdown, and restart.

When there's not enough contiguous free space on a hard drive to handle a whole file, the hard drive controller writes pieces of the file wherever they will best fit. These fragmented files can take longer to read into memory the next time they are used, slowing performance. DiskExpress II defragments files and places the most-used files at the start of the disk. DiskExpress works in the background, and you can specify when automatic optimization will be active.

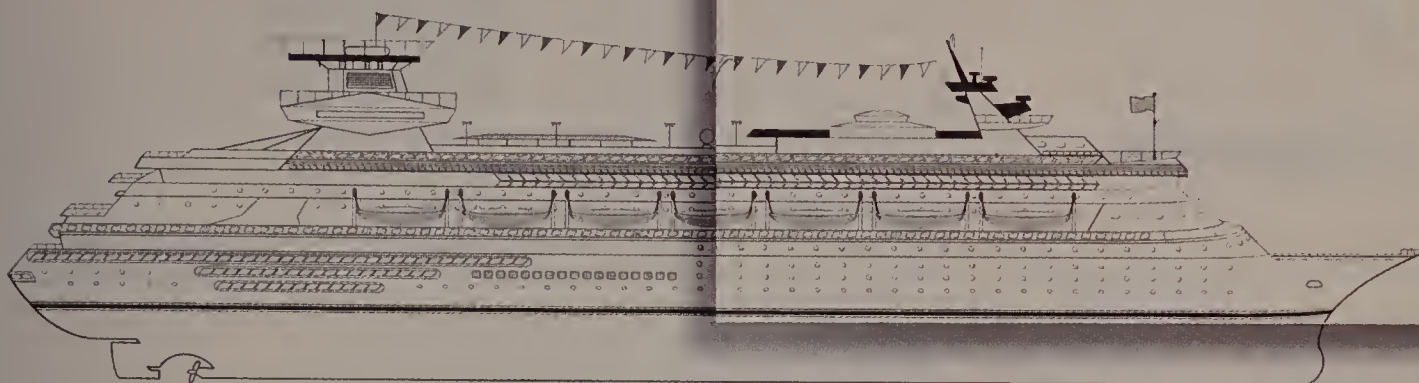
The other items in the package, though somewhat useful, seem to be mainly filler. Each does one or two things well, but competing products do the same tasks, and bet-

ter. For example, MenuExtend adds hierarchical menus for folders installed in the System 7 Apple menu; Microseeds Publishing's HAM does the same and lets you reorder the Apple menu items. NowMenus, part of Now Software's Now Utilities, adds a hierarchical menu to the Chooser and enables menus to drop without a mouse-click. DiskCheck performs a full read-and-write verify of your hard drive and checks for directory damage, but to fix any problems it finds, you need Apple's Disk First Aid, or the Norton Disk Doctor.

ScreenEclipse is a minimal screen saver. It dims the screen by the amount and at a time you specify, but it doesn't work on the Mac Plus, SE, SE/30, or PowerBooks, because they don't support screen dimming. Some freeware screen savers provide more functions than ScreenEclipse. Last, DiskFlash puts a flashing icon in the menu bar to denote drive activity. There are different settings for read and write activity. This is marginally useful on Macs lacking visible hard-drive lights, but it's mostly a toy.

If you need a disk optimizer and resource manager, this package makes sense, as you'll save money over buying MasterJuggler and DiskExpress II separately (\$49 and \$89.95 list price, respectively). But unless ALSoft beefs up the rest of the package, that's the only good reason to buy the ALSoft Power Utilities.—TOM NEGRINO

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8-Bit Flatbed Scanner

HP ScanJet IIP

PROS: Professional-looking scans; compact design; excellent value. **CONS:** Flimsy hinge on cover; inadequate documentation; technical support hard to reach. **COMPANY:** Hewlett-Packard (208/323-2551). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.5; hard drive. **LIST PRICE:** \$1095.



HEWLETT-PACKARD'S SCANJET IIP sets a new standard for affordable desktop gray-scale scanners. From its striking compact design to the great job it does with line art and black-and-white photos, the ScanJet IIP is an exceptional product.

The scanner is just 16 inches long by 11 inches wide by 3.25 inches tall, but it scans images up to 8.5 by 11.7 inches. The back panel holds a SCSI ID dial, a power cord plug, and both a 25-pin and a 50-pin SCSI connector. HP also supplies a 25-pin-to-50-pin SCSI cable and a 50-pin SCSI terminator. Unlike HP's old ScanJet Plus, which had an external power supply and a SCSI interface box and had to be the last SCSI device in a chain, the new scanner is a single unit that can be placed anywhere on the SCSI chain. However, the scanner's power

must be on for the SCSI chain to behave properly.

Marketed as a 300-dpi device, the ScanJet IIP uses interpolation to generate scans up to 600 dpi, making it possible to capture line art for high-resolution output. (The documentation neglects to mention that to scan at 600 dpi, you simply type **600** in the resolution settings in the DeskScan II software's Print Path window.) Line drawings scanned at 600 dpi on both the ScanJet IIP and Microtek's 600ZS and then output at 2540 dpi looked virtually identical. Enlarged to 300 percent in QuarkXPress, the Microtek scans were marginally smoother. (The 600ZS also uses a 300-dpi scan head plus interpolation, but is sold as a 600-dpi scanner [\$1995].) Photographs scan best without interpolation, but scanning photos at 300 dpi produces fine results.

The excellent gray scales are in part the result of HP's DeskScan II software and its ability to calibrate the scanner to a program and output device. Calibration is easy; deciphering the instructions is not. You can create and save custom settings that allow you to select calibration-and-resolution combinations in the main DeskScan window. DeskScan can automatically adjust contrast

**Outstanding Output**

This photograph, scanned at 300 dpi, output beautifully on a Linotronic L300 at 150 lpi, 2540 dpi.

and brightness; select the most important part of an image (a face, for instance), and DeskScan balances the whole image accordingly. For truly professional-looking gray scales, I'd still want Photoshop for its image-manipulation features. The ScanJet IIP also works with LightSource Computer Image's Ofoto software (select the ScanJet Plus driver).

The ScanJet IIP has no Photoshop plug-in. Instead, it supports Twain, a new protocol for scanning from within applications. Zedcor's Desk-

Paint is bundled with the scanner and uses Twain. For improved OCR (optical character recognition) performance, HP's AccuPage technology is built into the ScanJet IIP; HP offers an optional document feeder for rapid OCR scanning.

The ScanJet IIP's printed documentation is good, but minimal. Most information resides in 700K of online help that is muddled and difficult to understand. Also, the scanner's cover sports a plastic hinge to allow books to sit on the glass; it seems flimsy and destined to break. Otherwise, the ScanJet IIP is an elegant piece of technology. It delivers excellent results for a street price of around \$750.—BILL JUSTIN

Word Processor

Nisus Compact 3.3

PROS: Inexpensive; multilevel undo; XTND format conversions; battery-charge display. **CONS:** Memory quirks; limited feature set; poor documentation. **COMPANY:** Paragon Concepts. (619/481-1477). **REQUIRES:** Mac Plus; hard drive. **LIST PRICE:** \$150.



HONEY, I SHRUNK THE WORD PROCESSOR!" Nisus Compact, a stripped-down version of Nisus 3.0, bills itself as "perfect for the PowerBook," presumably because the PowerBook is compact, and thus needs a compact word processor. And it's compact in price and in disk space (363K versus 845K for the big-brother version). Unfortunately, the feature list is very, very compact, excluding many useful components. Missing are the dictionary and thesaurus, hyphenation, graphics editing, menu keys, mail merge, cross-references, table of contents, indexing, word count, macros, online help, and program editing. Nisus Compact retains only a small portion of its progenitor's eclectic feature set: multilevel undo, pattern matching, attribute search and replace, Clipboard editing, and column se-

lection. A handful of excised features are available as extra-cost add-on modules: dictionary and thesaurus, mail merge, and menu keys. After you register your purchase, Nisus also sends balloon help.

Nisus Compact's 200-page manual seems to be carved out of the original Nisus user's guide. Many features, such as searches using wild cards and replacing attributes, are inadequately or confusingly described. The index is missing entries for many basic functions (for example, find and replace).

Nisus Compact has a few features to appeal to PowerBook users. A thick I-beam cursor eliminates the problem of losing the cursor on the PowerBook's slow-reacting LCD screen, and a battery-charge-level indicator lets you monitor the PowerBook's battery level. A clock displays the time, and a sleep menu command lets you put the PowerBook to sleep without switching to the Finder. But all of these features are available as shareware utilities. This Nisus also supports Apple's XTND file-translation system, so you can convert just about any other word processor format.

A File Clerk feature, available only under System 7, is supposed to augment the Finder for managing documents. It lets you organize Mac files into user-defined categories, view the categories as sorted lists within predefined constraints, and open documents directly from the lists. However, moving or

duplicating files using the Finder confuses the File Clerk; yet you cannot move or duplicate files from within Nisus (other than via the Save As command). File Clerk is of limited utility if you run full-size Nisus on your base-station Mac.

Nisus 3.0 can read and process files created by Nisus Compact, but Nisus Compact doesn't support all of Nisus 3.0's features. You can inadvertently lose cross-references, index markings, and other Nisus 3.0 text attributes if you aren't careful.

In memory usage, Nisus Compact is not compact. It needs at least 900K—more than WriteNow, MacWrite II, WordPerfect, and curiously, even Nisus 3.0 need. But 900K is a minimum; tests with a 100K file produced "out of memory" alerts after only a few minutes of use. Simply editing a document uses up memory because of the multilevel undo. You can reduce the undo depth, but plan to use at least 1000K when editing average-size (100K to 300K) documents.

PowerBook users can get more features at about the same (or lower) price as Nisus Compact with MacWrite II and WriteNow 2.2, neither of which have the memory quirks of Nisus Compact. The only real advantage of Nisus Compact to existing Nisus users—reduced disk space—can be minimized by larger PowerBook drives and disk-compression utilities. An unfortunate case of too little too early.—MEL BECKMAN

LinksWare 1.4

PROS: Run-time version allows distribution of document sets; links are easy to create; includes XTND filters; supports QuickTime. **CONS:** Incomplete documentation; doesn't explain hypertext concepts; limited navigation aids; no way to backtrack links. **COMPANY:** LinksWare Corporation (800/879-5465). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.5. Recommended: Hard drive. **LIST PRICE:** \$189.



FUTURISTS HAVE OFTEN POINTED to hypertext as an electronic answer to printed books. Rather than depend on the sequential layout of printed material, hypertext allows readers to move from one area of a text document to a related section of text in a nonsequential or nonlinear fashion.

Macintosh users have been able to create hypertext links among documents in a single format using Claris's HyperCard, OWL's Guide, and Eastgate Systems' StorySpace. A new program, LinksWare, allows you to create hypertext links between documents stored in any format. Unfortunately, LinksWare needs to improve its hypertext navigation and display capabilities.

To use LinksWare, you create a LinksWare index file and open the first document you want to use. (LinksWare uses Apple's XTND filters to read word processor or graphics programs.) To create a link, you select a word in the first document, instruct LinksWare to form a link, and open a second document. You can repeat this for any word within any open document. LinksWare does not let you select a phrase or sentence, nor can you select a specific part of a document to be linked to another document (a link to a part of a file is planned for the next version).

To locate a particular linked document, you first select the linked word from a list (containing all linked words in all documents) that appears in the menu bar under Links, and the linked file automatically opens. LinksWare displays a list of either linked words or linked files to assist in navigation, but shows neither the name of the linked file nor a path so you could backtrack to the original linked word.

I found the program's method of indicating links inconsistent. If a document contains no styled text, links are underlined. If the document contains styled text, the linked word is displayed in italics.

LinksWare works with any text document or any word processor or graphics files that are compatible with XTND translators. (LinksWare can also link to, and play,

QuickTime movies.) Because LinksWare uses XTND translators to open some documents, it can take a long time to open a formatted document. For example, an 8K-to-10K Word 4.0 document containing text in italics, bold, and underline took more than 15 seconds to open (that's a lot if you open many documents, or open documents frequently).

LinksWare displays styled text, but it does not maintain paragraph or page formatting. All text appears in a standard-size window; if you change the size of the window, text does not reflow to fit the window—you must use a horizontal scroll bar to see text that has flowed beyond the edge of the original window.

Unfortunately, LinksWare's manual only describes the program's menu items. No hypertext examples come with the program.

LinksWare does ship with a LinksWare Reader application. LinksWare Reader lets users without the LinksWare program open a set of linked documents. Such users cannot, however, alter the documents or links using the LinksWare Reader.

LinksWare is easy to use, and the LinksWare Reader allows the easy distribution of documents sets. But if you need to create complex hypertext links between different portions of a document and require better navigational assistance, LinksWare is not the program for you.—DAVE KOSIUR

SupraFaxModem V.32bis

PROS: Inexpensive; fast; informative front-panel LED status display. **CONS:** None. **COMPANY:** Supra Corporation (503/967-2400). **REQUIRES:** Mac Plus; hard drive; System 6.0.2. **LIST PRICE:** \$479.95.



WHEN THE SUBJECT IS MODEMS, the terms *faster* and *cheaper* are almost always synonymous with *better*. The SupraFaxModem V.32bis (snappy name, that) sends and receives faxes and data at speeds of up to 14,400 bps, at an attractive price. In addition to supporting the CCITT V.32bis standard for 14,400-bps communications, the modem can also communicate at all of the slower modem speeds, including 9600, 2400, 1200, and 300 bps. The modem includes the V.42 error-correction protocol, and also V.42bis data compression (see "How to Buy a Modem," in this issue).

The SupraFax package consists of the modem; a hardware handshaking cable (hardware handshaking is a protocol that ensures that the Mac can keep up with the flow of data from the modem); FAXstf fax software; and Software Ventures' Micro-

Phone 1.6, a telecommunications program. Supra sells the modem alone for \$399.

The SupraFaxModem V.32bis's styling is reminiscent of many Hayes modems, with its brushed aluminum body and black plastic end caps. The compact (6½-by-4⅝-by-1-inch) unit uses an external power supply. The modem's front panel has a push-button power switch, four status lights, and an innovative alphanumeric LED display. The display is useful; when you're online, it tells you the speed at which the modem is connected (showing, for example, 96 for a 9600-bps hookup) and the error-correction and data-compression modes being used. The modem's back panel has the RS-232C data connection, a plug for the power supply, and two RJ-11 telephone jacks.

The modem is easy to set up and install, and the FAXstf software comes with an installer program. The modem is a pleasure to use. I called a wide variety of other modems, from other Supra V.32bis units to plain 2400-bps modems. The SupraFaxModem V.32bis automatically negotiates the fastest connection possible. With other V.32bis modems, I got consistently clean 14,400-bps connections. The combination of V.42 error correction and V.42bis data compression will theoretically increase data throughput by a 4:1 ratio, which would mean a top effective speed of 57,600 bps. In the real world, because of line noise and other inefficien-

cies, you almost always get less. I was able to achieve data throughput of up to 26,930 bps. I had no problem connecting with AppleLink, CompuServe, and local bulletin board systems at 9600 bps and 2400 bps.

The fax software, similar to that used by PSI Integration, Dove Computer, and others, worked well. Sending faxes is as easy as printing; holding down the option key while choosing Print brings up the Fax Print dialog box. You enter the fax number and click on Send; the fax software converts the document to fax format, then sends it. You can set a delay, so that the fax goes out after business hours to save phone charges. The software handles receiving faxes equally well; you can save a received fax in either PICT or TIFF format for printing or viewing.

Documentation is good, and technical support (a toll call) is adequate. The only problem I had with the modem was a speaker failure. Tech support returned my call within a few hours and quickly issued a return authorization.

The SupraFaxModem V.32bis is an excellent value. The modem is fast, convenient, and has good fax software. While there isn't a large installed base of 14,400-bps modems to communicate with at the moment, the SupraFaxModem V.32bis is the same price as some 9600-bps modems. I strongly recommend the SupraFaxModem V.32bis.—TOM NEGRINO

Personal Contacts Manager

TouchBase 2.0

PROS: Easy to use; networkable; flexible data entry options. **CONS:** Displays only one window at a time; some inconvenient design choices.

COMPANY: After Hours Software (818/780-2220). **REQUIRES:** Mac Plus; System 6.0.5. Recommended: Hard drive. **LIST PRICE:** \$125.



PERSONAL INFORMATION MANAGERS (PIMs) help you keep track of names and addresses. Although After Hours Software's TouchBase is one of the best, it still has room for improvement.

TouchBase offers two ways to view data. The List view lets you scroll through all the names in a database. Double-clicking on a name in the List view switches you to the Detail view for that person. All fields are displayed in the Detail view. The Detail view also includes the Record Summary, which lists the person's name, address, and telephone numbers in a Rolodex-like area. Unfortunately, you can display only one view at a time.

The onerous part of any contact manager is data entry. TouchBase automatically formats initial caps or all caps when you en-

ter data in lowercase letters. TouchBase also automatically formats telephone numbers with or without parentheses or with a slash after the area code, a feature lacking in both Portfolio Systems' Dynodex and Power Up Software's Address Book Plus. TouchBase also provides customizable fields that can be used for electronic-mail addresses, or keywords for searching your database. In short, entering data is quick and easy.

TouchBase has good features for finding records, but Dynodex offers more options for record selecting and better marking features, although it is slightly harder to use. TouchBase does not allow you to select and mark records at the same time. TouchBase allows you to dial telephone numbers and automatically places the number 1 before the telephone number for calls outside your area code.

A TouchBase data file can be shared over a network or using System 7's file sharing. Each user needs a copy of the TouchBase DA. The program automatically handles record locking, so only one person at a time can modify a record, although any number of people can view that record simultaneously. After Hours recommends that shared data files hold no more than 6000 records for acceptable performance. With three users, 1000 records, and System 7 file sharing, the wait to display a particular record was only a few seconds, with about

the same time to save a modification.

Printing is a TouchBase strong point. The program can print many types of documents, including envelopes, labels, fax cover sheets, address books (single and double sided), and customized lists. TouchBase comes with templates for mailing labels (Avery and Dennison) and address books (Filofax, Day Runner, and Day-Timer). You can also customize templates, but there is no Save As for templates, so you must create each custom template from scratch. After Hours should also allow you to save printing preferences; now you have to go through four dialog boxes to print. I was able to print a wide variety of labels and address books using a LaserWriter and a Hewlett-Packard DeskWriter.

TouchBase still has some other rough edges. For example, you can't select the information displayed in the Record Summary for copying. There is a separate Copy Label command, but it omits the phone number. You need a separate utility to permanently re-sort your records. And it would be convenient to be able to add more fields to the List view; in this version, you're limited to displaying only four fields.

These problems, however, are relatively minor. TouchBase is a good program that accomplishes its main job—taking care of your personal contacts—quite well.

—TOM NEGRINO

Multimedia Software

Magic 1.0

PROS: Easy to learn and to use; good templates; moderate price tag. **CONS:** Can't rotate or scale animated objects; slow on sub-030 Macs; sparse documentation. **COMPANY:** Macromedia (415/442-0200). **REQUIRES:** Mac Plus; System 6.0.7; hard drive. Recommended: 2MB of RAM; 4MB of RAM for System 7 or color. **LIST PRICE:** \$395.



MACINTOSH USERS WHO WANT to create multimedia presentations no longer need to master complex programs like Authorware Professional or MacroMind Director. Magic is easy to learn and easy to use. When I first unwrapped Magic, I used the templates to create a ten-scene interactive presentation with text, motion, sound, and fancy transitions between scenes—and it took less than an hour.

Magic comes with 15 sets of well-designed templates. If you find a template set you like, you can easily create a presentation by typing over the placeholder text in the templates. Magic can export a single frame as a PICT file, or an animation as a PICS file. MacroMind promises QuickTime compatibility by late spring.

If you don't want to use the templates, building a presentation is still a straightforward process. First, you create individual scenes of text and graphic objects (called actors), then you add path-based movement to selected objects and text blocks, and then you link the individual screens together.

Editing animations in Magic is also easy. The Cue palette gives you time-based control and synchronization of each scene's movement, transitions, and sound in a single chart that lets you easily coordinate complex actions with the mouse. Magic's editing features are outstanding.

It's easy to add interactivity to a Magic presentation. Any actor can be turned into a button that when clicked beeps, highlights, or activates another scene. You can reorder thumbnails (small representations of your scenes) of all scenes to change the sequence of your presentation and still maintain your interactive links.

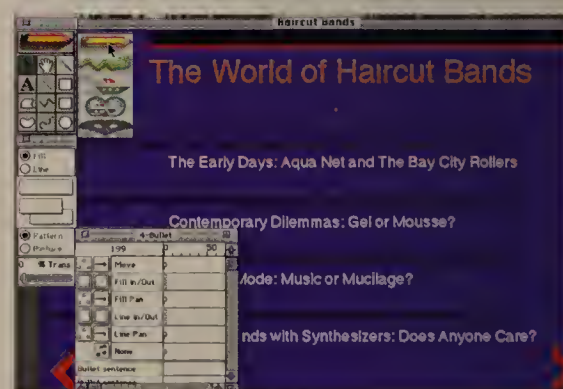
Magic includes QuickPICS, an application that compresses a PICS file or a sequence of PICT files into a faster- and smoother-running file that plays directly from a hard drive. Macromedia (formerly MacroMind ParaComp) also includes a runtime version of Magic and allows distribution of finished presentations.

Magic is easy to use, but that doesn't mean you'll turn out beautiful, informative presentations. The program comes with

four disks of clip media (clip art, animations, sounds), some good template sets, and an adequate tutorial.

Magic doesn't offer the features (or the learning curve) of programs like Director or Authorware Professional. For example, you can't create objects that change shape or rotate as they move. Magic's linking capabilities don't match Director's, and you can't access laser-disc players without using a program like MediaMaker.

Magic can't do everything, but what it can do it does well. Many of the multimedia presentations I've seen could have been created in Magic. So, if you want a painless path to creating multimedia, take a good look at Macromedia's Magic.—JIM FEELEY



Making Magic Magic uses the same tools to create graphics and to add movement to those graphics. The Cue palette gives clear control of action in each scene.

Strategy Game

Spaceward Ho 2.0.1

PROS: Fine graphics; easy to learn; humorous and absorbing. **CONS:** Occasionally responds oddly to your requests. **COMPANY:** Delta Tao Software (408/630-9336). **REQUIRES:** Mac Plus; hard drive; System 6.0.5. **LIST PRICE:** \$59.



NO DOUBT ABOUT IT, SPACE IS THE final frontier. But Spaceward Ho doesn't seek out new civilizations or adhere to prime directives. It's just like real life—all capitalism and imperialism.

During setup, you specify the composition of your galaxy, the number of opponents, and their levels of intelligence: dumb, average, or smart. When the opponent is dumb, even a novice can win. If the opponent is average, you have to be extremely aggressive or it'll be a long, drawn-out game. If the opponent is smart, you've had it. You can also play one or more real human beings, taking turns on a single computer or playing over a network.

The play starts with you governing your own planet, which comes with an active population mining your world's resources and generating a handsome global income.

As your colonists work away, your job is to locate resources, distribute funds, and govern the militia. As you investigate neighboring planets, your scouts report back the habitability of a planet and the abundance of its resources. You can colonize the planet with the simple intent of strip-mining it dry, or you can establish a productive economy, a remote refueling base, and then strip-mine it dry. When first colonizing a new planet, you have to spend money on mining and terraforming, which makes the planet more hospitable. For example, a planet can forever have a gravity of only half your home planet's, but via terraforming, you can ensure a pleasant 72 degrees Fahrenheit all year round. Needless to say, the welfare of the colonists has nothing to do with charity or benevolence, but rather with generating cold, hard cash. A happy planet, you soon learn, is a profitable planet.

But lurking out there in the galaxy are one or more faceless enemies. In an attempt to defend yourself and eliminate your foes, you use most of your surplus income and every scrap of mined metal to build space-ships. You should also invest some remaining income in new technology so that you can build stronger, more efficient ships. Unfortunately, if you stop funding mining, you run out of metal and can't build any more ships. If you stop building ships, the enemy destroys your colony and cuts off your



The Army Each ship is assigned its own whimsical appearance based on its range, speed, weapons, and so on—one of the many visual pleasures of this absorbing strategy game.

source of metal. A special problem shows up when you try to mine and build ships on the same planet. If you slightly underfund the planet as a whole, the program tells you that you have no money allocated for ship building. Delta Tao claims this oversight will be remedied in a future upgrade.

I spent less than 15 minutes skimming the documentation before playing the game. With a little experimentation, I even played moderately well. Then out of nowhere, after several hours of play, the computer surrendered. That's it? My opponent is dead? What's a general to do when the enemy gives up the ghost? The answer is to start another game. And another. And another.

—DEKE MCCLELLAND

Interactive Fiction Game

Sherlock Holmes, Consulting Detective

PROS: Beautiful video scenes. **CONS:** Slow play; not challenging. **COMPANY:** Icom Simulations (708/520-4440). **REQUIRES:** Mac LC, Mac II; 2MB of RAM; color monitor; CD ROM drive; System 6.0.7. **LIST PRICE:** \$69.95.



SHERLOCK HOLMES, CONSULTING Detective, looks nifty and is a cool concept. Still, the true measure of a game is how much fun it is, and to be blunt, Sherlock Holmes isn't much fun.

The basic premise is that you are competing with Sherlock Holmes to solve three different mysteries. You begin at the table of contents, where you choose the case you'd like to solve. After a brief introduction, you select the main screen icon. The main screen, where all action takes place, is surrounded by eight icons.

The table-of-contents icon and the judge icon are purely functional. The judge icon takes you to a judge who determines whether you have solved the mystery, by asking you a series of questions. (You don't

get to hear the judge's questions until you have seen the appropriate clues; this forced me to play the first case for an extra half hour to find proof for an assumption I had already made.) Two icons are for list-keeping: the directory is a complete list of characters from all three cases, plus characters from Sir Arthur Conan Doyle books, and the notebook enables you to record a list of names from the directory for quick reference. The remaining icons provide clues.

The newspaper icon is a more readable version of the paper newspapers included with the game. The Holmes's files and Baker Street Irregulars icons are also text clues (the Baker Street Irregulars report in by telegram). Unfortunately, the screen draw is slow, and only occasionally are the clues interesting enough and significant enough to be worth the wait for the image.

The game is really all about travel. Each time you click on the horse-and-carriage icon as well as a name from either the directory or the notebook, Holmes and Watson travel to the selected character. Occasionally no one is home, but if the character is relevant to the mystery, you watch Sherlock and Watson interrogate the witness.

Although the video can be choppy and pixelated, the scenes are beautifully done. They're wonderfully staged, coherent, and well acted. But the interface can be frustrating. The video scenes have buttons like a

VCR's, including pause and stop. Unfortunately, rewind always takes you to the beginning of the scene, and a useful fast-forward is nonexistent. If you missed a name—easy to do with the actors' Holmesian English accents—you have to start the scene over. And you can't fast-forward slightly, so you have to sit through the whole scene all over again (you can at least stop the scene once you hear the missed dialogue).

Apart from choosing which icon to use and which character to research, most of the game is just sitting and watching. The scenes are interesting, but as a game, Sherlock Holmes lacks variety and challenge. It's only slightly more interactive than TV, and the picture's not as good. I solved the first two cases within three hours, and to tell the truth, I was too bored to solve the third. For \$69.95, I would rather have gone to the movies ten times.

If you're going to check it out anyway, at least take two words of advice: Be careful. The innocuous words *CD ROM drive* on Icom's list of requirements are not exactly the whole truth. To run video, your CD ROM needs a seek time of 380 milliseconds or better; your data transmission speed must be 150K per second; and it might help if you have a data cache on your CD to smooth out the video. On older or slower CD ROM players, Sherlock Holmes might not play at all.—WENDY SHARP

Legal Software

Nolo's Living Trust 1.0

PROS: Great value; can edit saved trusts; can preview saved trusts and return to editing mode; supports multiple fonts. **CONS:** Can't preview partially completed trust. **COMPANY:** Nolo Press (510/549-1976). **REQUIRES:** Mac Plus; System 6.0.1. **LIST PRICE:** \$79.95.



NOLO'S LIVING TRUST IS A WELCOME departure from other Macintosh products in the estate-planning genre, such as Jian's LivingTrustBuilder and Legisoft's TrustMaker (see *Reviews*, *Macworld*, March 1992). What differentiates Nolo's Living Trust from the competition is its ability to make the Mac facilitate, not hinder, the drafting of a trust document.

First, Living Trust offers both online program help and legal help at virtually every step of the drafting process. Second, you get a stand-alone application, not a collection of text clauses that you must assemble manually via a word processor. Third, you can review and edit clauses containing lists of property and beneficiaries once you have entered them. Fourth, you can preview the full text of a completed trust and then return

to editing mode to make changes as necessary. And fifth, Living Trust lets you save a trust document as a text file but issues appropriate warnings about the legal implications of tinkering with that file.

The product is a carefully-thought-out, well-designed Macintosh application. Each trust is saved to disk as a named document. Once a file has been created, Living Trust presents an overview of the seven-step trust-drafting process: specifying state, name of trustor, name of trustee, and so on. The program monitors your progress and prevents you from moving to step two until you have completed step one. When you complete all seven steps, you can preview the trust and then return to drafting mode to enter any corrections.

Dialog boxes provide useful tips throughout the drafting process—telling you not to start your property description with *my*, for example, and not to capitalize a given entry unless it's a proper noun—virtually eliminating the need to go back and redraft clauses in the trust.

The program also supports a sophisticated level of branching. If a trust has multiple beneficiaries, some of whom are minors, you can specify a custodian for each minor without affecting the other beneficiaries. Implementing such a scheme is as easy as clicking on a few buttons and answering a few on-screen questions.

The ability to edit lists of information is one of the primary benefits of this product. You build a list of assets to be placed into a trust by using Add and Delete buttons in the Property List dialog box. If you create a list of ten items and then want to delete item number eight, simply jump back to that screen, click on item number eight, and press the delete key.

Nolo's Living Trust 1.0 comes with a comprehensive manual that provides technical information for setting up the software as well as legal information about the creation, modification, and termination of living trusts. The manual also contains sample trust documents, along with checklists for ensuring that your efforts will have legal effect once they have been printed and signed. Obviously the software cannot prevent a user from entering the wrong state or spelling a beneficiary's name incorrectly, but Living Trust does a noble job of guiding a person through the drafting process.

In short, this product makes drafting a trust with a computer the way it should be. You can concentrate on content and not worry about how all the sentences are hooked together. If you want to modify a beneficiary or delete property from the document, it's simple to do that without creating an entirely new document from scratch. This is a polished product and a great value.—BILL DAVIES

Script-Writing Tool

StoryLine 1.02

PROS: Contains entire contents of Jack Truby's Story Structure class; includes four classic movie examples. **CONS:** Contains entire contents of Jack Truby's Story Structure class; lacks useful reports; poor documentation; large display preferred; hardware-key copy protection. **COMPANY:** Truby's Writers Studio (310/575-3050). **REQUIRES:** Mac Plus; 2MB of RAM (5MB with System 7); hard drive; System 6.0.5. **LIST PRICE:** \$345.



GOOD PLOTTING IN A SCREENPLAY can make the difference between an audience that's on the edge of its seats and one that's vacating them. StoryLine professes to offer expert training in the craft of plot development. It promises to "lead you through the thicket of superficiality to what your story is *really* about." For me, however, StoryLine only complicated my efforts to adapt my first novel for film.

StoryLine is HyperCard-based. Since most of its cards are large, StoryLine works best on a large display. It's hard to view even single cards on a small screen, and next to impossible to compare multiple cards. Cards in each of the primary stacks (called sec-

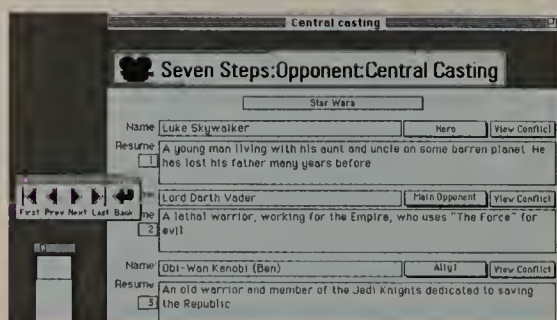
tions) contain blank text fields, in which you enter important character and story attributes, such as Hero's Basic Action and Power Structure. Some fields are somewhat obscure. One calls for "psychological and moral opposites of the fundamental qualities of the basic action," that is, "those qualities in your hero that are the reverse of what your hero will experience in the basic action of the story." I was taught that a character's qualities are not always revealed during the writing process; characters show their personalities through action and dialogue.

There's no clearly chronological process in StoryLine. There is a 7-Step feature, but with over 20 sections to choose from, working with the program is frustrating and sometimes haphazard. Once you've filled in your characters' attributes and motives, world view, symbols, and other story elements, you can study your plot data with

different views. For example, the Conflict view lets you compare your main character and main opponent side-by-side, so you can adjust their differences accordingly, for maximum opposition. However, StoryLine does not analyze your supplied data; it simply gives you a structure and leaves it to you to determine if the story will work on the big screen. Also, there are no useful reports; you're limited to printing out your cards.

In addition to providing an elaborate skeleton on which to construct your screenplays, StoryLine ships with sample screenplays for four movies—*Star Wars*, *The Godfather*, *Vertigo*, and *The Verdict*—each lovingly deconstructed from Action to Zoom shot. As you make your way through familiar characters, conflicts, motives, and scenes, you discover what each story is really about—according to StoryLine's author, screenwriter Jack Truby.

Although Truby clearly put a great deal of thought and experience into translating his eight-week screenwriting class into a Macintosh program, I cannot recommend StoryLine. Perhaps graduates of the class will find it a useful tool and a helpful refresher, and some users might benefit from the sample script analyses. However, the documentation is both jargony and skimpy, providing little guidance to the newcomer trying to navigate the complicated maze of stacks.—JOE HUTSKO



Lost in Space StoryLine's World Sequence section helps you probe your characters' psyches.

20 lb. copy paper

80 lb. text

60 lb. marbled paper

60 lb. text

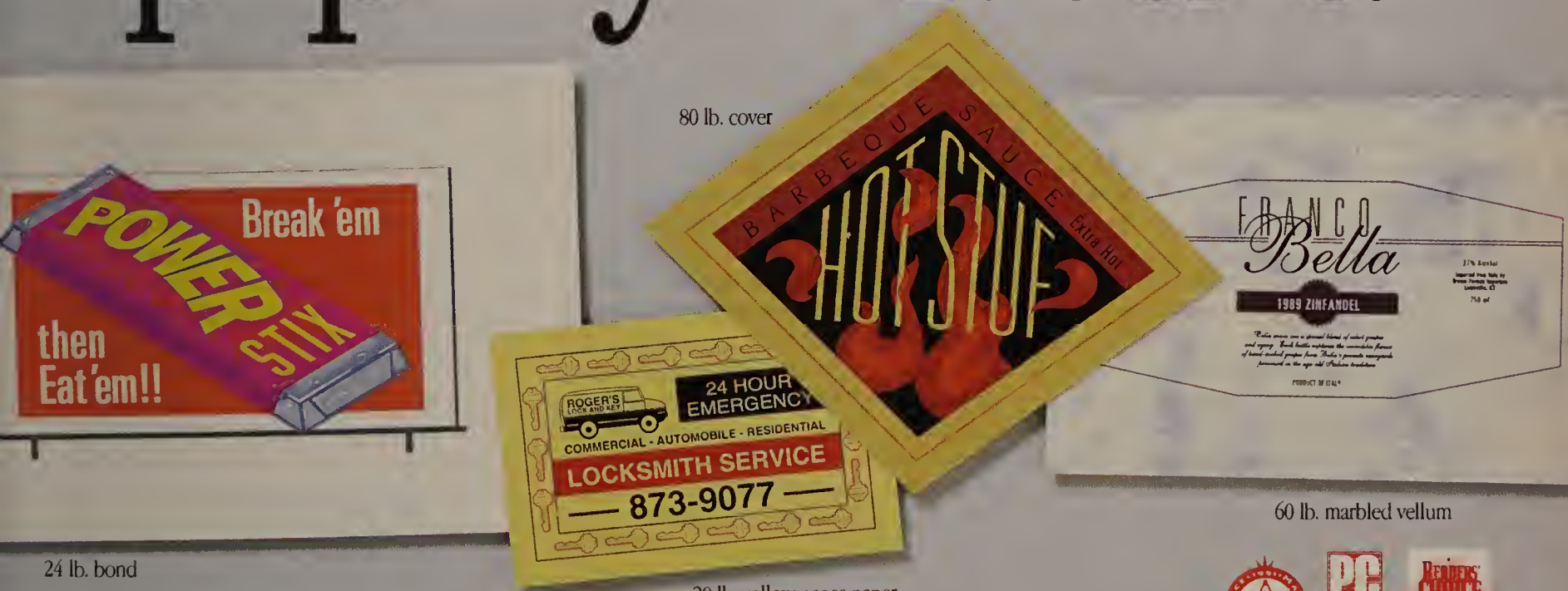
80 lb. cover

24 lb. bond

20 lb. yellow pages paper

60 lb. marbled vellum

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Have you ever wondered what your design would look like printed on a grocery bag? Okay, maybe not. But when you're working with a Phaser™ III color printer, your thoughts do tend to go a little wild.

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Circle 143 on reader service card

Programming Language and Environment

Think Pascal 4.0

PROS: Complete Pascal programming system with superior compiler; extensive class library for object-oriented programming. **CONS:** None.

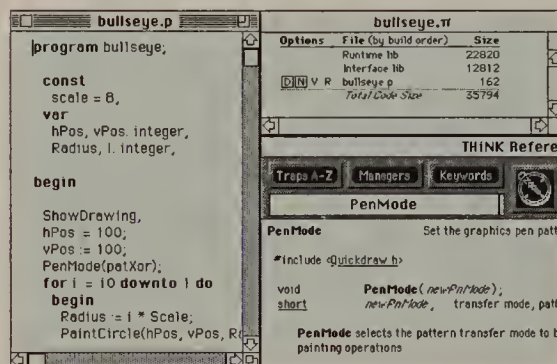
COMPANY: Symantec Corporation (408/253-9600). **REQUIRES:** Mac Plus; System 6.0. Recommended: 2MB of RAM; 4MB of RAM for Think Class Library or MacApp. **LIST PRICE:** \$249.



PASCAL WAS ORIGINALLY DEVELOPED as a teaching language, with features that militate in favor of clear code and against tricky programming. As it happens, many programmers take great pride in the tricks they can do in other languages, particularly C, and the 1980s produced many high-quality C compilers. Thus at present C is more popular than Pascal among professionals, although Pascal still dominates university courses.

Symantec has produced, in Think Pascal 4.0, a programming environment so good that its only serious competition is Symantec's own Think C 5.0. You can start learning the language with Symantec's training program Just Enough Pascal, using the new Instant Project feature to handle librar-

ies and organization. Then you can step through the sample programs in the Think Pascal user's manual, or use Pascal texts specifically coordinated with Think Pascal (*Macintosh Pascal Programming*, by Dave Mark and Cartwright Reed [Addison-Wesley, 1991] is just brilliant). You can even learn to master Mac Toolbox calls from Pascal with the \$99 companion program Think Reference, a well-organized hypertext version of the contents of *Inside Macintosh*, volumes I-V (see "The Whole Shooting Match"). Finally, there's an argument to be made that object-oriented programming in Pascal, benefitting from the early evolution of Macintosh Object Pascal, is a natural transition from standard Pascal and is easier than the transition from C to C++. Think



The Whole Shooting Match Think Pascal 4.0 can be used with Think Reference to make an ideal learning/programming system. Here's the PenMode routine in the little demo program Bullseye.

Pascal 4.0 is a remarkable accomplishment: a program good enough for professional programming that neophytes can also love.

Think Pascal 4.0 is very good indeed. Symantec claims a compilation speed of 60,000 lines per minute on a IIci (virtually the same speed as Think C 5.0), and I measured speeds averaging 48,000 lpm on an assortment of files. Please note that just a few years ago programmers lived with just a fraction of this speed in MPW Pascal, and also had nothing resembling the efficiency of the Think Pascal 4.0 linker or the convenience of the Project Organizer. In practice, the compiler/linker speed in 4.0 permits you to recompile comfortably after every tiny code change, a powerful debugging trick. The Lightsbug debugger itself is faster in earlier versions, and instant syntax checking with the editor's Pretty Printer is a wonderful touch.

Think Pascal 4.0 supports System 7 and the standard programmer's set of Apple events, as well as extensions to allow creation of larger programs and programs using virtual memory. The already immense Think Class Library has been enhanced with not just the System 7 classes, but also new classes for pop-up menus, improved text handling, and multiwindow documents.

Think Pascal 4.0 is an outstanding value, with no weak points and dozens of strengths.—CHARLES SEITER

Color Painting Program

Zeus 0.91

PROS: Paintbrush can automatically paint within the lines; QuickTime compression; allows re-shaping of last object drawn; separates spot and process colors. **CONS:** Text layer has problems; inadequate documentation and online help; buggy.

COMPANY: Delta Tao Software (408/930-7336). **REQUIRES:** Mac II; 2MB of RAM; color monitor; System 7.0. Recommended: 5MB of RAM. **LIST PRICE:** \$499.



TYPICALLY, ONLY BETA PRODUCTS (those still in the testing phase) bear version numbers lower than 1.0. Delta Tao numbers its newest product 0.91 to show that although it's shipping, Zeus is a program in progress.

Zeus retains the look and feel of Delta Tao's Color MacCheese and adds a handful of unique features. The paintbrush tool, in addition to offering antialiasing and a variety of shapes and sizes, can be configured to paint exactly within an existing outline. For example, if you begin painting on a white area of the document and your brush comes in contact with a black line, the paint will not cross that line. Other features unique to

Zeus are 24-bit masking and layering. Unfortunately, the manual sheds no light on how to use these functions. Worse yet, the layering feature is limited and cumbersome. To establish layering inside a Zeus document, you combine two existing images so that one shows through the white areas of another. To create more than two layers, you have to assign the background image its own background, and so on. As you might imagine, this enormously complicates the process of reordering and editing layers.

Zeus tries hard to match capabilities found in more expensive programs, sometimes successfully, other times not. Like Adobe Photoshop, Zeus exploits QuickTime's compression capabilities, allowing you to save PICT files at 10 to 20 percent of their normal size. Like Electronic Arts' Studio/32, Zeus lets you select and reshape the most recently drawn line or shape. Zeus also provides a text layer for printing high-resolution type. Unfortunately, Zeus doesn't handle object-oriented text nearly so well as Studio/32 does. First, Zeus provides no means for resizing a text block to compensate for column width. Second, though it handles TrueType fonts adequately, Zeus fails miserably when setting type in a PostScript font in combination with Adobe Type Manager 3.0. Like SuperMac's PixelPaint Professional, Zeus can create spot- or process-color separations, but you have to print

each separation manually and the process ignores items on the text and background layers. Finally, Zeus provides a rudimentary animation function with which you can subdivide a painting into a series of sequential frames. But Zeus in no way automates the animation process, nor does it support any of the common animation file formats, hardly qualifying it as a rival to the monochrome paint and animation program Studio/1.

Despite the consistently self-lauding style of the documentation, Zeus lacks a number of features you expect from high-end paint programs. Its selection capabilities don't measure up to those found in Studio/32 or Photoshop. Zeus's filters are hardly worth mentioning (though version 1.0 will reputedly support Photoshop filters). Furthermore, Zeus lacks support for pressure-sensitive tablets and it provides insufficient balloon help. Worst of all are the bugs. Throughout my testing, for example, the program crashed periodically when set to 4MB of application RAM, a strange phenomenon considering that it supposedly works on 2MB machines. At times when Zeus encounters an error message and you access another program such as a word processor document, when you return to Zeus, the same error message appears. For now, Zeus is a program brimming with good ideas and poor implementation.

—DEKE MCCLELLAND

Acecat for Macintosh

PROS: Low cost; lightweight. **CONS:** Hard to adjust aspect ratio; limited as a mouse replacement. **COMPANY:** Acecad (408/655-1900). **REQUIRES:** Any Mac with ADB port (not compatible with PowerBooks); System 6.0.5. **LIST PRICE:** \$149; plug-in power module \$19.95.



A MOUSE CAN'T MATCH A DIGITIZING tablet for drawing or tracing, but the high price of tablets has kept them beyond the reach of many Macintosh users on limited budgets (see "Input Alternatives," *Macworld*, June 1992). Now Acecad, a newcomer to the Macintosh marketplace, has introduced a tablet at a price that's sure to please cash-strapped artists. At a list price of \$149, the Acecat undercuts its closest competitor by more than \$300.

The 8-by-10-inch, 19-ounce Acecat works equally well on a lap and a desktop. The tablet communicates with the Macintosh through either the printer port or the modem port, with power provided by a cable that connects to the Mac's ADB (Apple Desktop Bus) port, or by a compact power supply that plugs into any AC outlet.

Overall construction is quite durable.

Like more-expensive tablets, the Acecat comes with a 6-inch stylus that's designed to be held like a pen or pencil. (An optional puck, a flat mouselike device with built-in crosshairs for tracing, is available for \$49.95.) To click or drag, you press a button on the side of the stylus with your finger. You can also simulate mouse clicks by pressing down on the stylus, activating a spring-loaded switch at the tip. Unlike some more-expensive products, the Acecat's stylus can't determine how much pressure you're applying to the tablet.

A green LED (light-emitting diode) near the top of the tablet flashes to let you know that the Acecat is plugged in. The light shines steadily when the stylus is close enough to the tablet's surface to operate reliably. (The indicator light is one of the Acecat's few annoying features—it's bright enough to cast an eerie glow in a dark room, and there's no way to turn it off.)

The tablet's active area measures 5 inches on a side. To ensure that a circle drawn on the tablet doesn't appear oval on screen, you have to adjust the tablet to match the shape, or aspect ratio, of your monitor. Unfortunately, this is a trial-and-error exercise using the rudimentary Control Panel software; Acecad ought to remedy this deficiency in a future release. The Control Panel also lets you activate and deacti-

vate the tablet without unplugging it.

Aside from freehand drawing (stretching my artistic talents to the limit), I spent a lot of time using the Acecat to trace artwork and photographs. Once the hardware was set up and the aspect ratio was adjusted properly, the tablet was fun and easy to use. Although I could not directly measure digitizing accuracy, cursor placement and tracking were consistent when I used either the stylus or the puck.

I also tested the stylus for standard Mac operations like clicking and dragging. As a mouse substitute, the Acecat earns only a passing grade. Unlike a mouse, the Acecat is an absolute pointing device: when you pick up the stylus and move it to another spot, the cursor jumps to a new position on the screen. This behavior, common to all tablets, takes getting used to if you're accustomed to a mouse. The ability to toggle between absolute and relative cursor positioning—a feature found in several more-expensive tablets—would be a welcome addition to the Acecat software. Double-clicking is also more difficult using the Acecat's stylus than with a mouse.

Although the Acecat lacks some of the amenities of high-end digitizing tablets, it works well, is convenient to use, and wins the price competition hands down. With a few software tweaks, the Acecat should become a top seller.—FRANKLIN N. TESSLER

Network SuperVisor 2.0.1

PROS: Full featured; powerful data-collection capabilities; topology editor maps live network. **CONS:** Some operations not intuitive; some features poorly implemented; no help function. **COMPANY:** CSG Technologies (412/471-7170). **REQUIRES:** Mac Plus; 2.5MB of RAM; System 6.0.4; hard drive. Recommended: Mac II or SE/30; 4MB of RAM; 12-inch monitor. **LIST PRICE:** \$495; 50 users \$795; 75 users \$995; unlimited users \$1295; Supervisor Jr. \$149.



NETWORK SUPERVISOR IS A FULL-featured network-management application with a detailed approach akin to that of a Swiss Army Knife. The program consists of an application that goes on the network manager's computer and a cdev that you install on systems throughout the network from which you want to harvest data. Unfortunately, some of the program's features fall a little short in intuitiveness and usefulness.

At the heart of Network SuperVisor is a 4th Dimension database that lets you scan all the machines on a network equipped with the SuperVisor cdev (control panel) and get

information concerning cdevs and INITs (extensions), software, system versions, NuBus and SCSI devices, and the CPUs themselves. You can also maintain a record of each machine, including its serial number, purchase date, purchase price, and the user's name, department, and phone number. You can combine and manipulate this information in a variety of ways to produce graphs and custom reports. You can also export it to another database or spreadsheet for further analysis, or to a word processor.

What separates Network SuperVisor from other network-management applications is that it doesn't stop at data collection. An alert function tells you when a Mac goes offline; a topology editor enables you to create live maps of your network; and a standardization function scans the network for a standard set of programs, extensions, or devices (defined by the network manager) and sends an alert when a user removes or substitutes an item. Network SuperVisor has no facilities for remotely working on networked machines, but you can send messages, make screen shots, and send (but not receive) files.

In an operational sense Network SuperVisor performs very well, collecting data speedily and accurately. The database itself is well designed and versatile, providing a number of report templates. What bothered me was the amount of time I had to spend

learning to use the application. Apart from the manual, there's no help—no balloons, no nothing. The manual includes a tutorial that leads you through the various functions, but the underlying logic of the program isn't explained until later in the manual. The interface itself is not so intuitive that you can easily maneuver unaided.

Also, some functions are awkward to implement. For example, to set a given device to alert you if it has a problem, you must manually enter the device name, type, and zone in a dialog box; you cannot simply choose from a list of devices currently online. If you make any mistakes in spelling or syntax, the connection will not be established. The alert function is also not available when you're browsing the database. It's not worth tying up 3MB of RAM just for a simple on-screen notification.

A much-reduced version of the application, Network SuperVisor Jr., also polls the network for hardware and software information and performs the standardization check, but it does not have the topology editor or alert function. At \$149, it's a great value for a network of 30 machines or fewer. For larger networks, especially ones that are just being set up and need to be inventoried, and where multiple zones and routers are involved, the full package can be beneficial in designing and managing the physical layout of your network.—MATTHEW R. CLARK

Personal Organizer

Active Memory 2.0

PROS: Strong network features; hot-key activation; support for multiple files. **CONS:** All task types must be added to a menu before they can be used.

COMPANY: ASD Software (714/624-2594).

REQUIRES: Mac Plus; System 6.0.4; Hayes-compatible modem required for phone dialing. **LIST**

PRICE: \$199; five-pack \$499; ten-pack \$899.



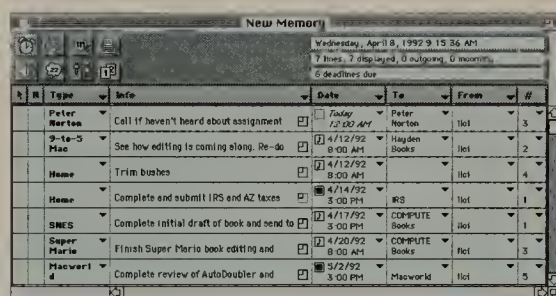
AMONG THE MANY PERSONAL ORGANIZER programs for the Mac, Active Memory distinguishes itself by providing strong network support. Active Memory lets you track your own projects and attach alarms to each; you can also use Active Memory as groupware, updating project information to and from other users' systems.

You can assign each activity a type, date, the people involved, priority, and free-form comments of up to 4000 characters. This information appears in columns with fixed headings (Type, Date, To, #, Info); but within each heading, classifications are up to you. Types can be general, such as tasks to be done for each activity (call, send, meet, and so on), or specific, such as project titles.

Active Memory has more pop-up menus

than any other application I've seen—one for every column and each data cell (except the Info cells). This speeds data entry, but it can also be a hindrance, since you can bump into a pop-up by mistake when you simply want to edit the cell contents. For example, each Date cell has one pop-up to select a date and another to choose the type of notification or alarm. You can add frequently used dates, alarm types, and import/export formats to the pop-up for those categories. To maintain consistency you must add each activity type to the Type pop-up menu before you can use it. There's no way to simply create a type as you work.

Active Memory has icon buttons for eight common tasks: display pending deadlines, dial a number (if you have a Hayes-compatible modem), search for a text string, print the entire contents of the current file,



Active Memory Display All the information you need is staring you in the face. The tiny triangles represent pop-up menus. Clicking the zoom box in any Info cell expands it to a full-size note window.

turn the Mac speaker off or on, put the program into sleep mode, bring up a calendar, or set preferences. The standard menus are almost superfluous; you need them only for unusual tasks such as printing selected activities or exporting data.

Nearly every column has display and sorting options that let you see just the records you want at the moment. When Active Memory triggers an alarm, it can notify you by a dialog box, a sound, or a beep; or you can set it to make the activity blink. You can also set an alarm to trigger an event, such as launching a given document. You can set up to ten alarms to trigger a macro (although Active Memory has no macro program of its own). Once you complete an activity, you can either delete it, save the related data as a new file, or export that information as text. Or you can create a special type, like Done, to distinguish it.

On a network, Active Memory can be a big help in coordinating group projects. You can use it to send selected activity records to others on the network—handing out assignments, say, or notifying all department members of an upcoming vacation. System 7 users can publish schedule information, allowing others to access it as needed.

At \$199 list, Active Memory may be overkill for a lone user. If you are working on a network, however, it's well worth considering.—STEVEN A. SCHWARTZ

Interactive French-English Picture Dictionary

Picture It 1.0

PROS: Good pronunciations; customizable.

CONS: Limited master list; no French definitions; poorly edited; quirky interface; occupies huge amount of disk space. **COMPANY:** Penton Overseas (619/431-0060). **REQUIRES:** Mac Plus; System 6.0.5; sound utility for input.

LIST PRICE: \$69.95.



J'ATTIRE VOTRE ATTENTION: THIS interactive French-English dictionary comes on 11 disks and requires a hefty amount of hard drive space—almost 11MB.

An image and a recorded pronunciation in French and English accompany each word on Picture It's master list. The images are straightforward if occasionally unpolished. Clicking on the Play English button invokes a man's voice saying the English word; clicking on Play Foreign produces a woman's voice speaking the French word. Both languages are clearly enunciated, the voices pleasant. And as you'd hope, the French sounds authentic. (Picture It is also available in Spanish, German, and Italian. A Japanese version is in the works.)

The master list is an uneven collection

of a mere 500 words—insufficient for thorough, ongoing study. It's missing *le vin* (wine), for example, but includes *la poitrine gymnastique* (balance beam). In addition to some odd choices, the list reveals sloppy editing, such as the misspelling *refridgerator* and two entries for *le steak*. The online documentation is similarly sloppy. Version 1.0 of Picture It is also buggy. When I used the Find command to locate *le thé*, Picture It gave me one of *le steak*'s. And English words are defined (in English) while the French are not—a glaring omission.

Picture It has four modes: Navigate, Flash, Type Answer, and Multiple Choice. The Flash and Navigate modes are useful for studying and reviewing vocabulary. In Navigate mode you choose words from the master list or a custom list. You can hide or show either the English or French word, click on the Find button to locate a specific word, and move through a list with the Next or Prev button.

In Flash mode you view and listen to words sequentially or randomly. Click on the View button, and pronunciations play as each word appears; click on Next, to proceed to the next word, or on Return, to go back to the Options display. You can choose whether the English or French text and audio play first, or disable the audio entirely.

Type Answer and Multiple Choice would be most useful for self testing, except

that they are roughly implemented. Type Answer mode displays an entry in one language and requires you to type the translation. If you choose to view the English and spell the French, you must indicate the word's gender in parentheses—(f.) or (m.). Unfortunately, in cases where the program's words have been input incorrectly, a correct response is counted as wrong. In the master list, two spaces were keyed between *la dinde* (turkey) and (f.); you must key in the same for your answer to be considered correct.

In Multiple Choice mode, you're given four possible French equivalents for each English word (or vice versa). Clicking on the right choice allows you to proceed to the next word. Choosing the wrong word results in an Incorrect Response message. Then you either press Reveal Answer or move on to the next word; you don't get another try among the remaining choices. In this mode and in Type Answer, a box at the window's upper left corner keeps score.

To make Picture It worth the \$69.95, you need to create some custom word lists—a simple but time-consuming task. With the added lists, Picture It can serve as a decent ancillary tool to a more complete curriculum. Still, it's hard to overlook the lack of French definitions—this is, after all, a dictionary. In the end I would choose another way to supplement *mon étude de cette langue magnifique*.—DOREEN KAN

Job Cost/Time Billing 1.05

PROS: Accounts-receivable and job-cost capabilities in one module; excellent report writer; can be integrated with General Ledger module. **CONS:** Interface is sometimes counterintuitive; documentation has omissions and errors; occasionally slow; minor bugs. **COMPANY:** Satori Software (206/443-0765). **REQUIRES:** Classic II; 2MB of RAM; hard drive. **LIST PRICE:** \$1495; Personal Entry option \$400 (allows unlimited users).



ANY TIME-BILLING AND JOB-cost programs are reasonably flexible for entering billing information and invoicing clients, but the reporting capabilities fall short. Satori's Job Cost/Time Billing, part of the company's Components series of accounting programs, incorporates high-end job-cost and accounts-receivable programs into one module, and the program includes an excellent report writer that allows you to create unlimited formats for invoices, statements, and reports.

At the heart of Job Cost are six entities—employees, actions, functions, clients, jobs, and phases. An action is a billable service or expense that you want to track, such

as a client conference or a telephone call. A function is a specific employee task that has its own cost. In the example of home construction, building a house is a job, pouring the foundation is a phase, and rough carpentry is a function.

The job setup is the key to Job Cost's flexibility. Each job can be billed either by time and materials or on a fixed-price basis. You can bill (or track) time and/or expenses by using a predetermined rate schedule, each employee's rate, or at cost. You can specify options such as overhead and markup percentages. Each job can be divided into an unlimited number of phases, and you can create detailed project estimates for each phase.

Once you have set up the business and job parameters, Job Cost lets you create an almost unlimited number of journals for recording time and expenses. There are seven journal types—time slips, time sheets, cash receipts, credit memos, trust accounts, retainer journals, and miscellaneous cash journals. When you enter journal data, you can override most default values. The program tracks data for each business object, such as billable, unbillable, billed, and unbilled; and tracks cost amounts for each job, phase, client, and employee.

For printing invoices, statements, and reports, the program has a robust report writer. Unlike most report writers, Job

Cost's is compact and straightforward. You can create virtually any report layout combining four simple types of objects—fences, calculations, filters, and graphs. A fence is a repeating group of related fields from one of the Job Cost files. A filter is a set of sorting, selection, and subtotaling criteria. A calculation field is a formula that uses other report data.

The program's reporting capabilities satisfy most time-billing and job-cost needs of almost any service business. It's not without its flaws, however. First, although the Job Cost interface is straightforward and well organized, it has some confusing elements. For example, the master file windows use horizontal scroll bars to move from record to record. If you edit a key field on an existing master record, the program actually creates a new record based on the edited information—it does not change the existing record. Second, the documentation has some errors and inaccuracies and the tutorial is sparse. The manual has no comprehensive setup examples and no index. The program also has a variety of minor, nondestructive bugs.

Overall, Job Cost/Time Billing is a reasonable first release that effectively addresses the needs of its target audience—service companies with sophisticated billing and job-cost requirements. Recommended, with reservations.—STEVE MANN

Correct Grammar 3.0

PROS: Customizable rule sets. **CONS:** Slow; poor design; odd and confusing errors; lack of support for common file types. **COMPANY:** Wordstar International (812/323-1740). **REQUIRES:** Mac Plus; hard drive. **LIST PRICE:** \$99.

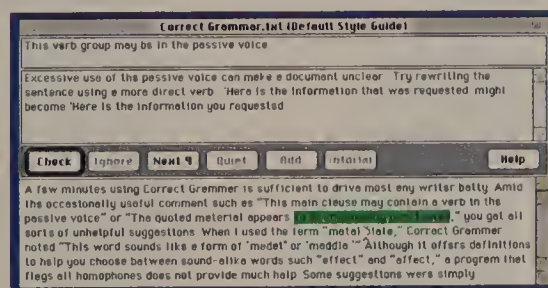


LANGUAGE IS MY BUSINESS. THE need to make my point succinctly and effectively, whether in a review, a feature story, or fiction, is paramount. Correct Grammar from Wordstar endeavors to help writers produce succinct, effective prose. Unfortunately, it fails for a variety of reasons; some failures stem from decisions made in designing the product, but most are related to basic problems with computer-based grammar analysis.

After launching Correct Grammar, you open the file you want to check and choose one of 11 styles (Academic, Informal, Legal, and so on). You can customize any rule set to ignore split infinitives, for example, or to note overly long sentences. Each problem is presented, in order, as the program analyzes the document. I would prefer to be able to optionally select a "pickiness level" and have

the program print out all its analysis—maybe even in order of severity—so I could consider it carefully.

A few minutes using Correct Grammar is sufficient to drive almost any writer batty. Amid such useful comments as "This main clause may contain a verb in the passive voice" or "The quoted material appears to be improperly punctuated" are unhelpful suggestions. When I used the term *metal plate*, the program noted "This word sounds like a form of 'medal' or 'meddle.'" Although it offers definitions to help you choose between sound-alike words like *effect* and *affect*, a program that flags all homophones isn't very helpful. Some suggestions were simply incorrect. "Consider using 'as' or 'as if,'" Correct Grammar offered, when the original *like* is clearly correct. Sometimes it recommends the plural form of a verb, when the singular is needed.



A Fine-Tooth Comb You may feel like returning to pencil and paper after Correct Grammar finishes picking over your prose.

Correct Grammar violates Mac interface conventions in irritating ways. When you quit the program, it gives a text-readability analysis, even if it has checked only one word in the document. System 7 features are poorly implemented. The Help button, for example, simply toggles help balloons on and off, instead of offering substantive help, such as to explain why you would want to know "syllables per 100 words." And while the program claims support for many file types, I had to continually resave my Microsoft Word 5.0 documents to Correct Grammar in text format. Experiments with DOS versions of WordPerfect and Word proved equally failure-prone. Correct Grammar actually tried to analyze the formatting codes.

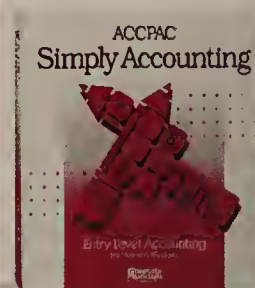
On the upside, the program offers several customizing options, and it has numerous preset writing styles, although they're very similar. Correct Grammar also comes with a sample file and related tutorial in the clear documentation. Ironically, when I used Correct Grammar to check the first chapter of its own documentation, it identified nine grammar errors.

Somewhere along the way, Wordstar seems to have missed the goal of this application. Though worthy in its aspirations, Correct Grammar offers precious little assistance in improving your writing.

—DAVE TAYLOR

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Circle 82 on reader service card

The Quest for WPM

BY DAVID POGUE

IN 1872, TYPEWRITER DESIGNER Charles Sholes found that the keys on his new prototype jammed if struck too quickly. Did he stride back to the lab, determined to overcome this technical challenge? Nah—too much trouble. Instead, he concocted a keyboard arrangement that was so stupid, so illogical, that people couldn't outtype his machine. It worked (or didn't work, depending on how you look at it), and we've wasted untold billions of finger-miles on that obsolete layout ever since.

In 1930, an efficiency nerd named August Dvorak studied the language and devised a better layout. It places the common letters—*E, T, S*, and so on—right under your fingers on the home row. It increases your speed by 20 percent, accuracy by 50 percent, and your fingers only have to travel 1/16th as far. It was brilliant—but it arrived during the Depression, when people were too depressed to learn anything new. Nobody resurrected the Dvorak arrangement until 1978, although it's been gaining popularity ever since.

That was only one attempt to help us type with less effort and more words per minute (wpm). Here are eleven others.

Half-QWERTY 1.1

HALF-QWERTY IS A SYSTEM EXTENSION (INTT) that, when you press the spacebar, turns the left half of your keyboard into the right half (and vice versa), allowing you to type the whole alphabet with one hand. The Matias Corporation suggests you can use your free hand for the mouse.

A casualty of the keyboard's asymmetry is the apostrophe, which has no corresponding key in the half-QWERTY setup. The brackets, plus sign (+), and hyphen (-) disappear too, unless you use the right side of the keyboard. And capital letters are tricky. Surprisingly, one thing that isn't hard is learning Half-QWERTY; somehow your brain triggers the appropriate finger of your left hand instead of the right. Within 15 minutes, I could type at 20 wpm if I really concentrated (and didn't need any apostrophes).

Half-QWERTY is a bit overpriced at \$79.95. Otherwise, for one-handed people—or those with a mouse, a piece of paper, or a drink in one hand—Half-QWERTY isn't half bad.

The Bat

EVIDENTLY, INFOGRIP IS ANOTHER COMPANY that thinks two hands are one too many. The Bat (\$495) is a peculiar-looking replacement keyboard with only seven keys. By pressing various combinations of keys, or *chording*, you can type every letter, number, symbol, and cursor key. You get two of these keypads, one per hand (each can type all the characters), which can be as far apart as you want. The padded heel rest and the 20-degree angle make your hands comfortable.

The company bet me a steak dinner I could learn the alphabet within an hour. They won—barely—but that's not to say learning this system is easy. The key combinations make no sense at all (why do you have to press four keys for an *O*, but only one for a *Y*?). The utterly confusing manual and noninteractive HyperCard tutorial don't help a bit. And even the pros can only muster around 30 wpm (says the company). Some "industry observers" swear by chording keypads—but I think this one actually makes the QWERTY layout look efficient.

The Sword 1.4.2

THIS NICELY EXECUTED CONTROL PANEL is an abbreviation expander (Abbre-V-8, \$69). It comes with a quick-reference card packed with 200 common words and word parts—like *-tion* and *-ing*—and their corresponding abbreviations. You're supposed to type *t* instead of *the*, *u* for *you*, and so on; instantly, the program expands the abbreviation to its full form. The program even adds a space after each period and capitalizes the first letter of sentences for you.

Most of the abbreviations are easy to remember: *mb* means *maybe* and *ns* is *necessary*. Some are not, like *j'* for *year* and *qj* for *thing*. Another quibble: the manual is nearly impossible to read (eight fonts or styles on a page is typical). But if you appreciate having 200 ready-to-go abbreviations, then this is your program. Know, though, that The Sword's rivals let you create thousands of your *own* expand-o-words; The Sword's user-definable list is limited to 40.

Typelt4Me 3.0

THIS TRULY WONDERFUL SHAREWARE gizmo (by Riccardo Ettore, who requests \$30) is handy for anyone who'd like to do less typing and make fewer typos. Like The Sword, TypeIt4Me expands abbreviations. But TypeIt4Me abbreviations (like *DT*) can stand for a much longer spurt of typing (like *ex-billionaire playboy Donald Trump*). A cheat-sheet list of all your codes appears in the TypeIt4Me menu (squeezed in on the left side of the Apple menu). Best of all, TypeIt4Me lets *you* decide what the abbreviations are.

The program is also great for auto-correcting common typos, like typing *and* every time you type *adn*. And if you ever have boilerplate text—anything from *Yours truly* to multipage blobs of legalese—TypeIt4Me is indispensable. You almost forgive the fact that it doesn't distinguish capital letters, which means that your abbreviations can't begin a sentence. America Online and user groups have it; go GetIt4Yourself.

Thunder 7 1.0.6

THIS PROGRAM'S SLICK TYPE-EXPANDING feature has one whopping advantage over TypeIt4Me: Thunder 7 is smart enough to capitalize the expanded word or phrase if you capitalize the first letter of the abbreviation as you type it. Thunder 7 is even smart enough to capitalize all the letters of an expanded word when you capitalize the whole abbreviation.

There is just one disadvantage: it's a drag trying to remember your abbreviations. You can't see a list unless you open your word file (a five-step process), which you can't leave up on the screen. (You can print it, of course.) It seems to me there was one other little feature . . . oh yeah, Thunder 7 is also a full-featured spelling checker and thesaurus (Baseline Publishing, \$99.95).

Magic Typist 1.7.2

MAGIC TYPIST (\$99) IS YET ANOTHER abbreviation expander, with a clairvoyant twist. As you type, Magic Typist silently learns every word that's

continues



Beating the
tragic
QWERTY
layout

longer than seven letters (or a length you set). The next time you type the first few letters of that word, Magic Typist expands it automatically. If there are several possible conclusions of the typed-word-in-progress (such as *beatnik*, *beatific*, or *Beatrice Arthur*), a minimalist pops onto the screen, listing the possibilities by number. Press the appropriate number key, and Magic Typist zaps the word right into your manuscript.

Only one thing mars this clever, lazy-person's approach: Magic Typist *always* pops its little list when it's proposing an expansion, even if there's only one possibility. That's a shame, since that means it can't correct common typos like *adn* on the fly (as TypeIt4Me does). Olduvai Corporation, which recently acquired the software, plans a software, manual, and packaging overhaul.

Typing Made Easy 1.8

THIS INTERACTIVE PROGRAM (QED INFORMATION SCIENCES, \$49.95) is a computerized version of your tenth-grade typing teacher. You get the whole spiel, complete with constant exhortations not to look at the keyboard and those awful "aaa ;;; a;a ;a;" typing drills.

Two big problems. First, the program doesn't show you what you're typing and doesn't beep when you make a mistake. Therefore, it's entirely possible to type an entire exercise off by one letter, and never know it until you finish and get a grade of zero.

Second problem: Typing Made Easy isn't made for learning to type on a *computer*. There's no lesson on using the numeric keypad. Dumbest of all, you're actually penalized when you don't type two spaces after a period. Hey, this is 1992! We got proportional fonts now, bub!

Type Right

THIS TYPING TUTOR (BARRON ENTERPRISES, \$39.95) has only Geneva text, no graphics, punctuation mistakes in the on-screen instructions, and no way to jump ahead if you get sick of an exercise. And because it is written in Microsoft Basic 1.0, Type Right is so slow that you can easily outtype it.

Typing Instructor Encore 2.1

TYPING INSTRUCTOR ENCORE (INDIVIDUAL SOFTWARE) is the program for the MTV generation: friendly, varied, graphics-laden, colorful. It has some nice touches: you can make up your own drill

material, you can learn to use the numeric keypad, and an excellent tutorial on word processing covers ergonomics and copy-and-paste. Lots of Chicago font in a small window is a bit ugly and 1985ish, but the content compensates, and the \$29.95 price sure is right. (No Dvorak, and once again you're expected to type two spaces between sentences. Weird.)

Frankly, I spent most of my time in the Lobster Sea Adventure—the first typing drill capable of giving you an adrenaline rush. You have a one-second head start, and then it's your mistake-free typing versus the lobster's appetite. Childish, goofy, but it really works.

Mavis Beacon Teaches Typing 1.3

THE BOX FOR MAVIS BEACON (THE SOFTWARE TOOLWORKS) says "The Finest Typing Program in The World." I guess I concur. This tutor program has so much artificial intelligence (AI), variety, and articulate plain-English feedback, that it's the only typing tutor that doesn't somehow feel amateurish. The brilliantly written, painstakingly researched manual alone is almost worth the \$49.95.

Mavis, the AI being inside the program, analyzes your progress and makes neat discoveries: that your right ring finger is the weakest, say, or that you tend to use the correct finger but the wrong row, or that you take too long to recover from making a mistake. She even studies your rate of errors and, when it's obvious you are getting cranky, suggests you play her typing arcade game. You can make up your own drills, although Mavis's real-world examples are clever and funny (none of that *fffjff* stuff). I wish there were a numeric-keyboard workout. But believe it or not, this is the only typing tutor that can teach you the Dvorak layout. And a ghostly outline of your hand illustrates the correct fingering.

Typing Tutor 5 1.0

THIS PROGRAM (QUE, \$49.95), TOO, USES artificial intelligence to individualize your

lessons; it also shows you a keyboard with some jagged-looking transparent hands to show you where to put your fingers (a feature modeled on Mavis).

Typing Tutor's Natural Language Generator creates drill sentences that are composed of words the program thinks you need work on. Typical example: "That faddist <backstabbing beside that academy> depicts. A belduque was fought with at Caporetto!"

The impulse to get away from wordless letter drills is nice, but I'd rather work on meaningful text than Typing Tutor's high-tech Mad Libs. There are some pretty multicolor graphs to show your progress, but there's no Dvorak training and you're again forced to type two spaces after a period.

The Upshot

WANT TO IMPROVE YOUR WPM? THEN learn the Dvorak layout. No keypad gizmo can touch it for efficiency and comfort. A typing expander can save even more time and labor—TypeIt4Me isn't perfect, but it's the most convenient, flexible, and price-effective.

Whether you're learning Dvorak or QWERTY, Mavis Beacon should be your teacher. Or, if you are young and learning to type for the first time, consider Typing Instructor Encore's livelier, more colorful approach.

P.S.: To put your Mac into Dvorak mode, just get Keyboard Switcher (for System 6) or a Dvorak keyboard layout (a System 7 module). Both are available from America Online or user groups. Go for it; Dvorak only took me a couple days to learn, I can still use the wretched QWERTY layout when necessary, and I can type for pages at a time without making a single mistake. **m**

See *Where to Buy* for contact information.

Contributing editor DAVID POGUE types 75 wpm, sleeps 8 hpd, eats 3 mpd, and is trying to improve his \$py.

TYPING TUTORS

	Typing Made Easy	Type Right	Typing Tutor 5	Typing Instructor Encore	Mavis Beacon
Teaches numeric keypad	○	○	●	●	○
Word processing fundamentals	○	○	○	●	○
User-definable test documents	○	○	●	●	●
Live diagram showing hands	○	○	●	○	●
Permits 1 space after a period	○	○	○	●	●
Includes typing video game	○	○	●	●	●
Color/sound	○/○	○/○	●/●	●/○	○/●
Online program help	●	○	●	●	●
Understands curly quotes	○	○	○	○	○
Teaches Dvorak layout	○	○	○	○	●

● = yes; ○ = no.

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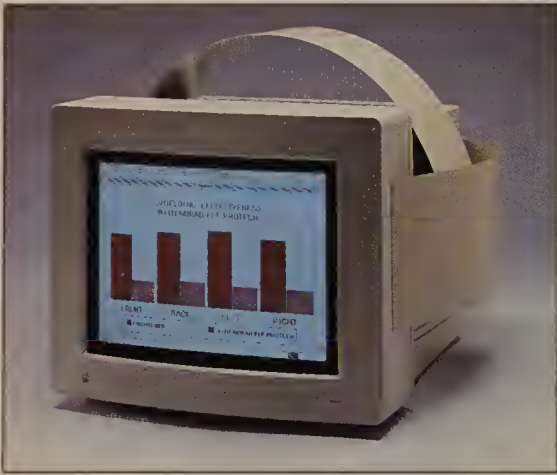
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Circle 129 on reader service card

Monitor Radiation News

1-800-262-3260

Vol. 1



New Product Blocks ELF Magnetic Radiation

NoRad Corporation is now shipping ELF ProTech, the first externally mounted Extremely Low Frequency (ELF) magnetic field radiation suppressor for video display terminals (VDTs). Independently tested on popular monitors, ELF ProTech reduces ELF magnetic fields to well below the latest Swedish standards (SWEDAC, MPR II).

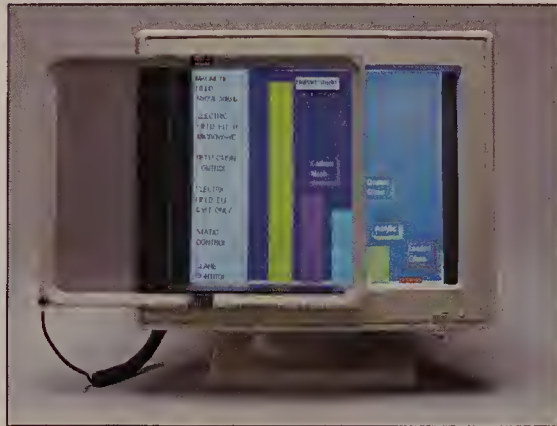
NoRad's proprietary technology (patent pending) safely absorbs ELF magnetic radiation by up to 70% *all around the display*—front, back, sides and top. And, the higher the field strength, the greater the reduction.

For the first time, you can upgrade your current monitor with external shielding rather than buy a new, low magnetic radiation monitor. Installed in minutes without special tools, ELF ProTech preserves image quality and *safeguards warranties and computer performance.*

ELF ProTech's universal design fits all monitors, and is color-matched to today's displays.

New Shield Delivers Brighter Image

The NoRad Shield, the industry-standard radiation and glare shield, is now even better. Advancements in manufacturing give NoRad Shield users High Light



Transmission (HLT), *which increases image brightness by a full 50%.*

Already the highest resolution shield available, NoRad has increased the Shield's resolution even more—to 260 lines per inch. This means a clearer image from your monitor.

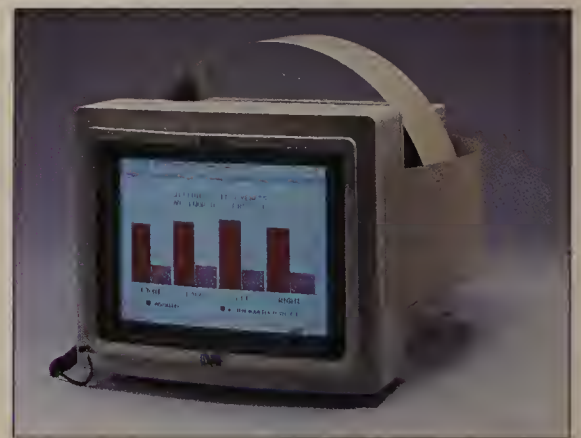
Independent Tests Support NoRad Product Line

An independent, government-certified laboratory has tested the NoRad Shield and ELF ProTech to verify performance and shielding effectiveness.

Using U.S. Military Standard 285, the NoRad Shield was tested against the leading technologies which claim radiation protection. Only the NoRad Shield blocked 99.99% of virtually all electric field radiation—not only ELF and VLF, *but all the way up into the microwave*

range, and greater than 50% of the total magnetic radiation above 30 KHz - the broadest protection available.

ELF ProTech was tested according to the most stringent Swedish standards (SWEDAC, MPR II) for its ability to suppress ELF magnetic radiation from popular, high-emission monitors. ELF ProTech brought magnetic fields at *all* of the required 48 test points below the 2.5 milliGauss benchmark, and a dramatic 37 of the 48 points were *below 2.0 milliGauss.*



Together They're Unbeatable!

It's a fact that monitors and VDTs emit electromagnetic radiation across a wide range of frequencies, in both electric and magnetic fields.

With the NoRad Shield *and* ELF ProTech you have the *best solution for monitor radiation.* To order or receive a *free* booklet on "The Myths and Facts of Anti-Radiation Screens" call:

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NoRad

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New Products

The Latest Macintosh Releases

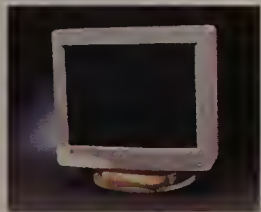
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HARDWARE

20-inch Color Display

A 20-inch color system that has a screen resolution of 1024 by 768 pixels at 72 dpi and a screen refresh rate of 75Hz. The system can be configured to display 8-bit or 24-bit color, has front-mounted control knobs, and uses a Hitachi tube. 8-bit system \$3195; 24-bit \$3995. Generation Systems, 612/633-5222, 800/325-5811; fax 612/633-1083.



20-inch Color Display

ColorLink DC/T

An 8-bit color board designed for Macs with few expansion slots; supports monitors up to 21 inches in size from E-Machines and others, and has built-in Ethernet support. The board has fast EtherTalk Phase II drivers, has full AppleTalk support, and is compatible with Novell's Network for the Macintosh. The DoubleColor's graphics features include on-board acceleration, hardware pan and zoom, and virtual screens. \$649. E-Machines, 503/646-6699, 800/344-7274; fax 503/641-0946.

Flexscan F550ie

A flat-square 17-inch color display with a dot pitch of 0.28mm and 30kHz to 65kHz horizontal and 55Hz to 90Hz vertical scanning frequencies. The monitor can display noninterlaced images at resolutions up to 1280 by 1024 pixels and has digital controls for picture adjustments, so users can store up to 32 different signal combinations. The screen has a nonglare coating and the monitor complies to the Swedish MPR II guidelines for electromagnetic emissions. \$1749. Nanao, 310/325-5202, 800/800-5202; fax 310/530-1679.

GatorStar GX

A LocalTalk-to-Ethernet router-repeater that is built around a 16.7MHz 68302 processor and has 24 LocalTalk ports, each able to connect to four Macintosh nodes. The device can detect malfunctioning LocalTalk nodes, remove the affected port from the network, and then restore the port when normal functioning resumes. It also supports multiple protocols, including AppleTalk, TCP/IP, and SNMP; the GatorKeeper software that is included allows users to configure, monitor, and manage the device from a central lo-



GatorStar GX

cation. \$3595; rack-mount version \$3895. Cayman Systems, 617/494-1999, 800/473-4776; fax 617/494-9270.

Information Station

A paperless display system with a 24-by-34-inch

screen that creates images by electrostatically applying toner to a white metallic film loop as the film scrolls past a print head. After an image has been displayed, the toner is collected for reuse. The display can be connected to a Macintosh via AppleTalk, and a user can then display any TIFF file by dragging the file to an



Information Station

icon that represents the Information Station. The product ships with Slide Show 3.0—software for creating sequences of images, delays, and linking—and has a 30MB internal hard drive. \$9998. Applied Resources, 913/469-9191; fax 913/469-0360.

Magic 21MB Floptical Drive

A floptical disk drive that connects to the Mac through the SCSI port and is based on the Insight drive mechanism, which offers 21MB of data storage on a 3.5-inch floptical disk. The drive can also read from and write to 1.44MB Macintosh-formatted and 720K and 1.44MB DOS-formatted disks; has an external termination switch and SCSI ID selector; and ships with formatting software. Floptical disks are \$27 each. \$479. MacProducts USA, 512/472-8881, 800/622-3475; fax 512/499-0888.

Magic RailGun Pro

A 68030 accelerator for the Mac Plus and SE available in speeds of 16MHz, 25MHz, and 33MHz; has built-in monochrome video output for single-page and two-page displays up to 21 inches in size, and comes with a 19-inch monochrome monitor. The board also has a math coprocessor and can be configured with up to 16MB of RAM. For SEs: 16MHz \$899; 25MHz \$999; 33MHz \$1199. For Pluses: add \$100 to SE prices. MacProducts USA, 512/472-8881, 800/622-3475; fax 512/499-0888.

Optima 96

A 9600-bps modem that provides v.32 connectivity, v.42bis data compression, and v.42 error control. It comes with a Mac-to-modem cable and Smartcom communications software. \$440. Hayes Microcomputer Products, 404/441-1617; fax 404/449-0087.

PowerCache Adapter LC

An adapter that enables the Mac LC and LC II to use DayStar's PowerCache NuBus CPU accelerators. The accelerators, based on the Motorola 68030 processor, come in speeds of 33MHz, 40MHz, and 50MHz and have an optional 68882 FPU. \$49. DayStar Digital, 404/967-2077, 800/962-2077, ext. 305; fax 404/967-3018.

PowerMath LC

Math coprocessor board for the Mac LC that contains a 16MHz 68882 floating-point unit for increasing the calculation speeds of math-intensive tasks. The board plugs into the LC's Processor Direct Slot and comes with SANE software to

further boost the speed of certain math operations. \$159. DayStar Digital, 404/967-2077, 800/962-2077, ext. 305; fax 404/967-3018.

PowerPad

A portable numeric and function keypad for the PowerBooks that connects through the ADB port and has an ADB port of its own so that other devices can be daisy-chained from the keypad. The number and operator keys are arranged as on



PowerPad

Apple's extended keyboard, and with one keystroke the user can switch from the number keys to 15 function keys. The product comes with 10Key Tape, a desk accessory that works like the tape on a financial calculator and accepts and displays input directly from the PowerPad. \$129; with CE Software's QuickKeys² \$189. Sophisticated Circuits, 206/485-7979, 800/827-4669; fax 206/485-7172.

RC-570 NuBus Electronic Still Presentation (ESP) Kit for Macintosh

A still-video-imaging kit that includes the RC-570 still-video camera, a NuBus digitizing board with an ESP piggyback board, and software for converting captured images to TIFF and PICT files. The video camera captures up to 25 still-video images on reusable 2-inch video floppy disks; users can then input the recorded images into a Mac using the NuBus board. The

piggyback board allows images from the Mac to be stored on the camera's floppy disks, and the camera can send images to any standard video display. \$4500. Canon USA, 516/488-6700, 800/221-3333, ext. 313; fax 516/775-4717.

SketchMate ME

A sign-making device that also works as a professional 8-pen plotter and is designed for creating architectural signage, presentation materials, graphic designs, and display signage. The device uses standard HPGL and comes with SignMate ME lettering software, which allows users to design vinyl signs using ATM outline fonts. A-size \$895; B-size \$1195. Roland Digital Group, 714/975-0560; fax 714/975-0569.

Tape 5000

An 8mm tape-storage subsystem that provides up to 5GB of backup per cartridge and has a 500K-per-second data-transfer rate, according to company literature. The drive ships with one tape cartridge, a drive-cleaning kit, and Retrospect Remote network backup software. Additional tape cartridges are \$59 each. The unit has a mean-time-between-failure rating of 40,000 hours, according to the company. \$6459. Storage Dimensions, 408/954-0710; fax 408/944-1200.



Tape 5000

TitleMan

A title generator that creates fully antialiased video

continues



TitleMan

titles from any PostScript font, and can render and antialias images from most popular Mac graphics packages. TitleMan includes a NuBus board that acts as a frame buffer; software for creating and editing PostScript type and graphics; and an external chassis that takes in black-burst reference and puts out RGB, linear key, and sync. Type can be expanded and compressed. The software includes an airbrush tool for creating custom mattes. 8MB min. memory. \$7995. Digital F/X, 415/961-2800, 800/955-8273; fax 415/961-6990.

Tower of Power II

An upgrade for the Mac II, IIfx, and IIfx that provides five drive bays (four half-height external bays and one internal full-height bay) and a fan-cooled 275-watt power supply in a tower enclosure. The basic model has a bracket for mounting a floppy drive, a power adapter circuit board, cables, and instructions. Options for the basic package include a variety of monitors, optical mice, SyQuest drive mechanisms, and keyboards. \$495. ATS, 404/292-6655; fax 404/299-1809.

TransWarp 040-33

A 68040 accelerator with a clock speed of 33MHz that uses copy-back caching and write-through caching to accelerate NuBus Macs. The board includes a floating-point unit (FPU) to speed math-intensive calculations, and has eight on-board SIMM sockets so users can add RAM. The product comes with a Control Panel device that allows users to turn the accelerator on and off and set it to sleep automatically when incompatible programs are launched. \$3399. Applied Engineering, 214/241-6060, 800/554-6227; fax 214/484-1365.

TruScan 3D

A three-dimensional 24-bit color scanner that has

a scan area of 12 by 17 inches and scans objects up to 2 inches in height at resolutions from 75 dpi to 900 dpi. The scan head passes above the object being scanned; the device also scans documents. Adobe Photoshop LE comes with the package, and the scanner can save images directly to disk. \$8695. Truvel, a division of Vidar Systems Corp., 703/742-5500; fax 703/471-1165.



TruScan 3D

TRX-B

A black-and-white densitometer for use in desktop publishing; measures densities and calculates density differences and dot areas in both transmission mode and reflection mode. The device automatically switches to transmission or reflection mode when the corresponding sensor is activated. The TRX-B also features automatic zeroing with the first reading, a 3mm aperture on the reflection probe head, and an RS-232C serial port for connection to a printer or process-control system. \$1975. Tobias Associates, 215/322-1500; fax 215/322-1504.

Ultima Home Office

A communications center that provides voice-mail, data modem, and fax capabilities in one device. The product incorporates a 14,400-bps V.32bis modem with MNP 5 and V.42bis error correction and data compression; package includes Maxfax software for sending faxes and receiving voice-mail messages. Users can create up to 999 voice mailboxes, each with a different message. Messages are played back through a telephone handset. \$649. Prometheus Products, 503/692-9600, 800/477-3473; fax 503/691-1101.

SOFTWARE

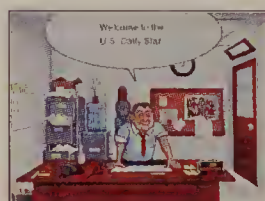
EasyShare Mac Menu

Software for launching applications and opening

files from a menu designed for a specific user group. Users do not need to use the Finder to access files; users see only files designated by an administrator as available to that user group. Each group is assigned its own password. 1MB min. memory. Prices range from \$99.95 to \$4995 for 1 to 1000 users. Learning Performance Corp., 612/854-2730, 800/926-3270; fax 612/854-8975.

Headline Harry and the Great Paper Race

A learning/adventure game in which players act as reporters on deadline for a fictional newspaper and try to piece together clues and file their story before the competition does. As they sort through keywords, dates, motion video captured in QuickTime format, places, and events, the players learn more about U.S. history



Headline Harry and the Great Paper Race

and geography. There are four levels of difficulty for the program and 8-bit color is required. 4MB min. memory. \$59.95. Davidson & Associates, 310/793-0600, 800/556-6141; fax 310/793-0601.

InHouse Subscription Manager

Circulation-management software for magazine and newsletter publishers based on ACIUS's 4th Dimension; simplifies subscription, circulation, and fulfillment tasks. The pro-



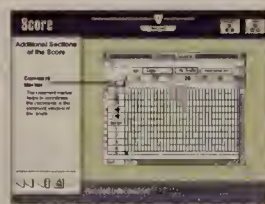
InHouse Subscription Manager

gram handles all publication frequencies and has comprehensive tracking capabilities for subscribers, orders, and transactions. Users can print issue labels, renewal notices, and invoices directly to high-speed impact printers. 3MB min. memory.

Pricing starts at \$1995 for publications with up to 10,000 subscribers. Sapphire Systems, 612/944-0212; fax 612/944-0699.

Interactive Training: Director

An interactive course created in Director that teaches users Director's key features, as well as multimedia authoring fundamentals and practices. The program also includes template movies, animation clips, and clip sounds that can be transferred into users' own presentations. 4MB min.

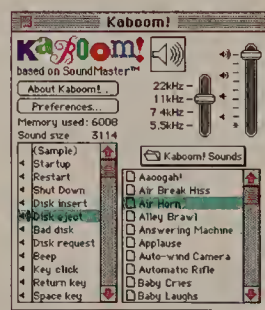


Interactive Training: Director

memory. \$199. Media in Motion, 415/621-0707, 800/395-2547; fax 415/621-1724.

Kaboom

A cdev (or control panel) that allows users to connect sounds to a number of Macintosh events including start-up, opening and closing windows, ejecting disks, and shutting down the computer.

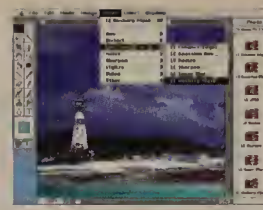


Kaboom

The utility includes over 150 sounds, ranging from roosters crowing to tires screeching. Sounds also can be played as chimes at the top of each hour. The package incorporates dialog from celebrities, politicians, and television shows. 1MB min. memory. \$49.95. Nova Development Corp., 818/591-9600, 800/395-6682; fax 818/591-8880.

Lightning Effects

A set of plug-in modules for use in Adobe Photoshop 2.0 and Fractal Design's ColorStudio 1.5 that take advantage of the MacDSP board from Spectral Innovations to



Lightning Effects

enhance and speed up image processing functions. The software supports a variety of masks, filters, scanning enhancement techniques, and rotation functions, as well as JPEG compression and decompression routines that are compatible with Apple's QuickTime extension. 4MB min. memory. Software alone \$295; with MacDSP board \$1295. Spectral Innovations, 408/727-1314; fax 408/727-1423.

Mac320, Mac330, and Mac340

A family of VT300-series terminal-emulation programs for connecting a Mac to Digital Equipment Corporation and Unix computers; all support VT52, VT100, VT200, and VT300 terminal modes. Mac320 provides Digital VT320 text emulation, and Mac330 is a VT330 emulator; both also offer color text and background capabilities. Mac340 is a VT340 text-and-graphics terminal emulator. Products have a review buffer that saves text as it scrolls off the screen; products allow user to save terminal sessions for access at a later time. 512K min. memory. Mac320 \$149; Mac330 \$249; Mac340 \$349. White Pine Software, 603/886-9050; fax 603/886-9051.

MacUSA

An electronic atlas with profiles and maps of all 50 states and Puerto Rico; contains detailed maps, graphics, and annually updated data. State information can be compared using bar charts or thematic maps, and the maps



MacUSA

and graphics can be exported in a variety of Mac graphics formats. The maps show major state features, elevations, and the location of major cities and towns; the program also shows each state's flag and plays all state songs. 1MB min. memory. \$59.95. PC Globe, 602/730-9000; fax 602/968-7196.

MicroLeague Baseball, the Manager's Challenge

A baseball simulation game that lets players control their own team and make coaching decisions to directly affect the outcome of a game. Players can make a batter bunt, hit away, or take a pitch; make fielder adjustments; and check the 30-player roster for potential pinch hitters or defensive replacements. A statistics compiler allows players to accumulate season stats and track league standings. After each game a complete box score can be printed. 1MB min. memory. \$49.95. MicroLeague Sports Association, 302/368-9990, 800/334-6572; fax 302/368-8600.

MIDISchool

An educational HyperCard program that uses interactive lessons and a built-in sequencer to teach the basics of using MIDI. The program saves student notebooks, which record each student's progress with the lessons, and contains a glossary of MIDI terms. The stack is designed in book format, with 12 chapters; each page includes an explanation of a MIDI term and a graphic. Many of the graphics are animated. 2MB min. memory. \$119. Eduactive, 603/668-4788, 800/824-4788.

NetMounter

A utility that gives Macintosh users access to NetWare file servers without using Novell's NetWare for Macintosh. Users can mount a NetWare server through the Chooser as they would an AppleShare volume, and all AppleShare services remain available while NetWare volumes are being used. The program uses a feature called Extension Mapping that lets users

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added a lot. To get more
storage, you could buy a
bigger hard disk, but that's
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open files on a NetWare server from within a Macintosh application. 1MB min. memory. Single user \$99; five users \$395; ten users \$595. Dayna Communications, 801/531-0600; fax 801/359-9135.

Nolo's Living Trust

Software that systematically leads users through a series of questions and then compiles the answers to produce a living trust that is valid and effective under the laws of users' state of residence. The user can set up an individual or shared marital trust, which can then be changed or revoked at any time. The program also features online help and a glossary of legal terms. 1MB min. memory. \$79.95. Nolo Software, 510/549-1976; fax 510/548-5902.

Ready For Trial

Software for trial lawyers and litigation support staff that is designed to manage and analyze deposition and trial transcripts. The program has a database engine and a full-text retrieval engine, and

lets users divide documents into segments and then characterize each segment for later retrieval. It includes 16 report formats, each of which contains a table of contents, and comes with TransFix, a utility for converting ASCII files into the program's format. 2MB min. memory. \$995. Robins Analytics, 612/224-1289, 800/767-3239; fax 612/224-2633.

Roll Call

A church-management software package that provides attendance tracking, a donation record system, visitation scheduling, and directory maintenance. A variety of subgroups can be created within the congregation list, and attendance records are kept by clicking on absentees' names. Receipts for donations can be generated for any time period, and comments from previous visits to individuals or families can be recorded in the church database. 2MB min. memory. \$495. By The Numbers, 219/293-4893, 800/554-9116.

ShadowLAN

Network software that allows users to share printer or modem ports with other Macs across an AppleTalk or EtherTalk network. By selecting a port from the program's cdev (control panel) and turning on the sharing option, users make the device connected to that port available to other users on the network who also have the software installed. Each shared port can have its own password so only selected users can access a particular port. 1MB min. memory. \$149; additional five-packs \$49. Applied Engineering, 214/241-6060, 800/554-6227; fax 214/484-1365.



ShadowLAN

Shakespeare and the Globe Theater

A tutorial HyperCard stack designed to introduce students to Shakespeare by providing details of his life and his family; the people who worked with him at the Globe Theater; the social hierarchy, religious beliefs, and living conditions of the time in which he lived; and an examination of the interior and exterior of the Globe Theater. The stack also includes the full text of *A Midsummer Night's Dream*; requires HyperCard 1.2 or later. 1MB min. memory. \$129. Shakespeare On Disk, 914/266-5705.

Time Treks

An adventure game, with 12 levels of play, that challenges players' knowledge of history and investigative skills and allows them to explore thousands of historical facts; 180 time lines; and hundreds of time-related views of science, communications, wars, empires, and so on. The program also has an archives section, where users can

browse through historical data; and the game contains quotations, color charts, and tables. 2MB min. memory. Consumer version \$59.95; educator version \$89.95; lab pack (five copies) \$269.95. EarthQuest, 415/321-5838; fax 415/322-3817.

Video Sampler Disk Set

A set of two disks containing a QuickTime movie player and three sample QuickTime movies. The set is designed to serve as an introduction to QuickTime, aimed specifically at people who have no other means (such as a digitizer or CD ROM player) of acquiring QuickTime content. 2MB min. memory. \$35. Northern Video Graphics, 612/338-6589.

CD ROMS

Berlitz Think & Talk Spanish

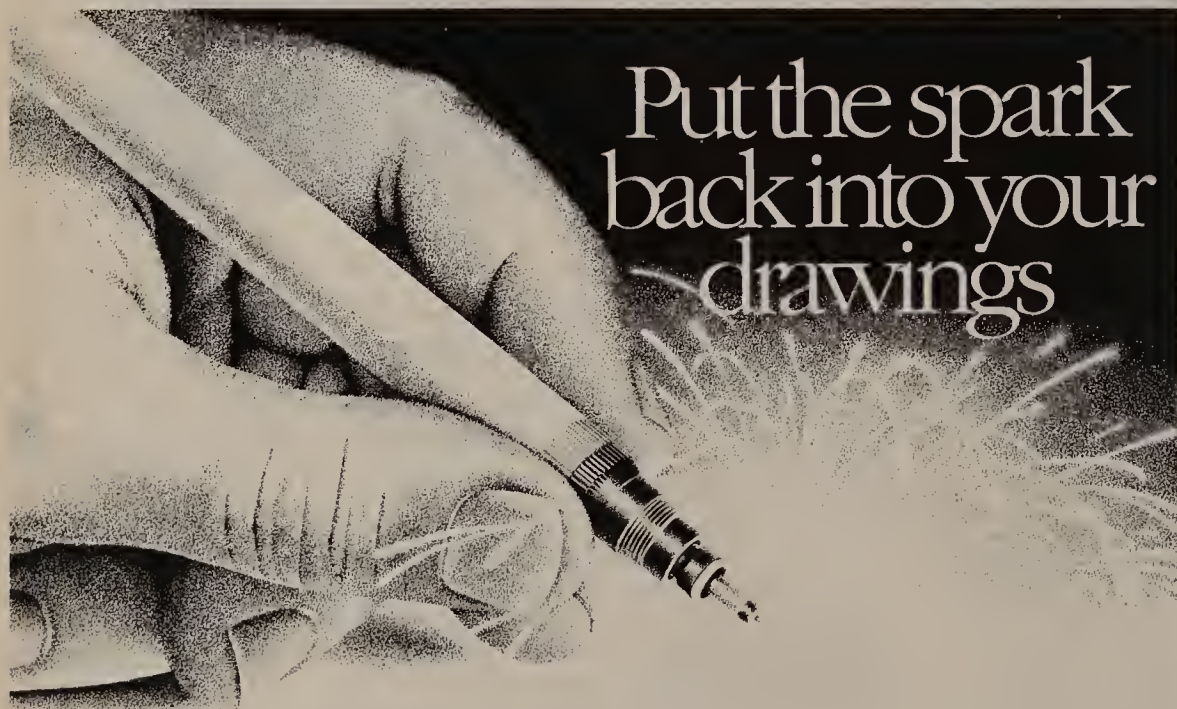
An application designed to teach practical Spanish by having the student listen to language as it is used in everyday situa-

tions and repeat what he or she hears. Dialogue and scenes with sound effects, music, and other audio cues are controlled interactively by users, and sentences can be heard as many times as a user likes. The course teaches more than 1000 words, has 50 language lessons, and has an online, bilingual dictionary. 2MB min. memory. \$199. HyperGlot Software, 615/558-8270, 800/726-5087; fax 615/588-6569.

ACCESSORIES

Cable Safe

An antitheft security product for the PowerBooks; includes a steel bracket that attaches to the bottom of the computer through existing screw holes on its underside, a cable that attaches to the bracket, and a padlock that can then lock the cable around any immovable object. The bracket folds underneath the computer when not in use, and the product comes with a Torx screwdriver, needed for instal-



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lation. \$39.95. Security Concepts, 310/576-6279; fax 310/576-6279.

DayMaker Travel Case

A carrying case for the Macintosh PowerBook that comes with DayMaker personal organization software. The case is made of water-repellent Du Pont nylon Cordura, has an open-back design that gives users access to cable connections on the back of the PowerBook, and is designed so users can work on the computer while it is still in the case. DayMaker software's features include scheduling, appointment tracking, to-do list management, and phone and address storage. The case also has a padded shoulder strap and a locking zipper. \$149.95. Pastel Development Corporation, 212/941-7500; fax 212/431-3079.

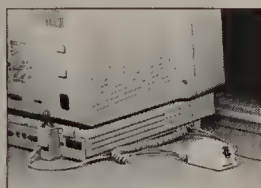
Desktop Color Guide

A process-tint color guide printed on one large, UV-coated reference sheet that contains swatches of

over 2000 process colors that can be compared with colors on users' monitors for printing color accurately. A reference table on the sheet shows the relationships between dots per inch, line-screen ruling (a measurement printers use), and data file sizes. The guide also contains color-scanning tips, color theory illustrated with RGB and CMYK conversions, and detailed process separation tips and techniques. \$24.95. Integrated Graphic Media, 818/963-7545; fax 818/914-1878.

Keyboard Lock for Mac LC

A keyboard lock that lets users disable the keyboard to prevent unauthorized access. Programs can run while the keyboard is locked. The keyboard cable plugs into a lockbox that plugs into the Mac's



Keyboard Lock for Mac LC

ADB port. A metal lock covers the Mac's port to prevent substitution of an unsecured keyboard and to protect the internal components from theft. \$99.95 to \$104.95. PC Guardian, 415/459-0190, 800/288-8126; fax 415/459-1162.

Kristal Clear

A line of clear glass filters for a variety of monitors that is designed to reduce glare, static, and electromagnetic emissions. The filters feature a hinged frame for horizontal and vertical adjustment that the company says allows the filters to fit 95 percent of the 12- to 19-inch monitors on the market. \$119 to \$200, depending on monitor size. Sunflex, 408/522-8850; fax 408/522-8840.

LANMax Surge Protectors

A family of eight surge protectors with catastrophic surge eliminators that disconnect any protected equipment in the event of a surge large enough to damage the protective circuitry. The



LANMax Surge Protectors

devices come in configurations to support a variety of network schemes and offer combinations of AC protectors and data cable protectors. \$149 to \$159. Panamax, 415/499-3900, 800/472-5555; fax 415/472-5540.

Mouse Yoke

A device that turns any mechanical mouse into an aircraft-style steering yoke for use with flight-, auto-driving-, and submarine-simulation software. Users clamp the yoke to a desktop and then insert the mouse under an elastic strap. Yoke movements



Mouse Yoke

are then translated into corresponding mouse signals. The device works with any software package that provides mouse support for directional control. \$34.95. Colorado Spectrum, 303/225-6929, 800/238-5983; fax 303/225-1663.

PowerBookOpener

A tool that consists of a socketed handle and special bits for opening the case of the PowerBook 100, 140, and 170. The product comes with instructions for opening the case, for users who want to install memory or cards. \$18.95. Central Products Corp., 713/529-1080; fax 713/529-2006.

BOOKS

Danny Goodman's Macintosh Handbook: Featuring System 7

A guide to System 7 printed on four-color 8-by-10-inch spreads, each divided into three levels of detail—beginner, intermediate, and advanced. The book also contains a glossary-based index and a

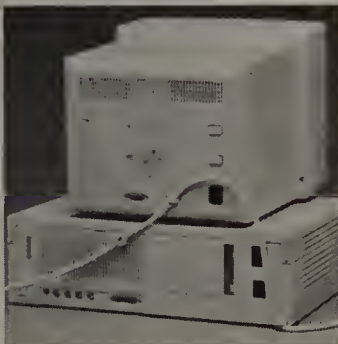
large troubleshooting section. A typical spread includes basic definitions for beginners, shortcuts and tips for intermediate users, and technical details for advanced users. All System 7 features are covered in detail, including installation, compatibility, publish and subscribe, and memory management. Written by Danny Goodman with Richard Saul Wurman. \$29.95. Bantam Computer Books, 212/492-9666, 800/223-6834, ext. 9479; fax 212/492-8941. [m](#)

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

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Questions and Tips from Macworld Readers

BY LON POOLE

MANY PEOPLE HAVE trouble operating a PowerBook's built-in trackball because it's so small (particularly on the PowerBook 100) and lightweight. You can't do anything about the size, but you can replace the original ball with a marble that weighs much more, as a tip last month suggested. The extra weight helps keep the ball from lifting up and losing contact with the rubber rollers that track its movement. Steve Mayzels of Cupertino, California, sent some detailed advice to augment the July tip. He favors Qualatex brand marbles, specifically Premium Quality Marbles—The Collector Series (made by Pioneer Balloon Company of Wichita, Kansas, and sold at many toy stores including Toys “Я” Us and Pay Less Drugs). Choose a style with a smooth finish—the Meteors, Silvers, Cat's Eyes, or Pearls. The Galaxies, which have a pebbled surface, don't work well as trackballs. Qualatex marbles come in a net bag with 35 marbles to play with (16mm) and one shooter (25mm)—the right size to replace the PowerBook 100's trackball. The PowerBook 140 and 170 require a 30mm marble, which Pioneer Balloon does not manufacture for retail sales.

Pick over the bags of marbles in the store and choose the smoothest one. Although a slight orange-peel texture won't affect tracking accuracy, it may make the marble rotate less freely. Toy marbles aren't manufactured to very strict tolerances, so you may have to buy several bags of marbles to find one that works reliably. If the marble is too large, it will bind; if it's too small, it will track erratically. Even if you buy several packages of marbles, you shouldn't have to spend over \$8 to find a marble that works as a trackball.

Stand-up Mac

Q I have a Mac II that takes up a fairly large portion of the middle of my not-too-huge desk. From time to time I've seen photos and ads in *Macworld* in which a Mac II was standing on its end

beside or beneath a desk or workstation. I'm tempted to try this with my machine, but my Apple owner's manual sternly promises a plague of locusts if I ever try to orient the computer in any except the “missionary position.” Is there a way that I can safely make my Mac II stand up on the floor, or will that cause the ball bearings to fall out of the math coprocessor?

*Jim Henry
Dallas, Texas*

A You can stand a Mac II, IIx, or IIcx on end if you keep it from falling over and provide an inch or so of ventilation space on all sides. The Vertical CPU Stand (\$19.95) made by Basic Needs (800/633-3703 or 619/738-7020) consists of two feet that you adjust to fit the cabinet, positioning them so they don't block the cabinet's air vents.

Colons Are Special

Q Why can't a file name have a colon in it?

*Sam Snow
Signal Mountain, Tennessee*

A Mac application programs and system software use colons internally in specifying the path through the folder structure to a file. A path name consists of a disk name, a succession of folder names, and a file name, with colons between them. For example, the path name Hard Drive:System Folder:Control Panels:Sound specifies the location of the Sound control panel on a System 7 start-up disk named Hard Drive. Putting a colon in a file name confounds the scheme for specifying paths.

Thick Hairline

Q When I use Deneba Software's Canvas 3.0 to print on an HP DeskWriter ink-jet printer, all lines thinner than 1-point print 1-point thick. Can you solve the problem?

*Yvan Lamontagne
Trois-Rivières, Quebec, Canada*

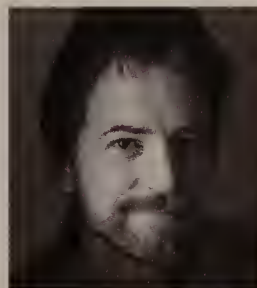
A You need to choose Rulers from Canvas's Layout menu and change the Printer option from ImageWriter to LaserWriter. The LaserWriter setting tells Canvas you are printing on a device whose dot density is an even multiple of 75 dots per inch (dpi); the DeskWriter's dot density is 300 dpi (75 × 4). The ImageWriter setting tells Canvas you are printing on a device whose dot density is a multiple of 72 dpi. When printing to a StyleWriter, you should set the Rulers command's Printer option to ImageWriter because the StyleWriter has a dot density of 360 dpi (72 × 5).

Hypothetical Question

Q Suppose someone put several hundred sound files in my System 7 Startup Items folder. How can I stop the sounds from playing during start-up so I don't have to wait for them all to finish before removing them?

*Bill Achuff
Philadelphia, Pennsylvania*

A To block the opening of items in System 7's Startup Items folder, press the shift key when the Finder's menu titles first appear in the menu bar during start-up. To additionally inhibit the loading of extensions from the Extensions folder, Control Panels folder, and System Folder, press the shift key when the smiling Mac icon appears at the very beginning of the start-up sequence. You can release the shift key after the “Welcome to Macintosh” message appears.



*Viewing desktop
items by
name, printing
11-by-17-
inch pages, and
more*

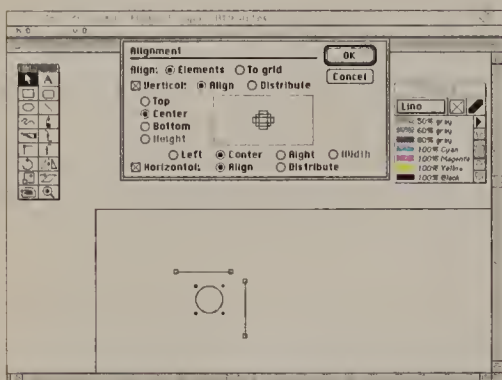
Word 5 Feature-Bug

TIP To copy the headers and footers from one Word 5 document to another, simply copy the last paragraph mark from one document and paste it at the end of the other. [To see paragraph marks, use the Show ¶ command or click the ¶ icon in the ribbon normally displayed at the top of

continues

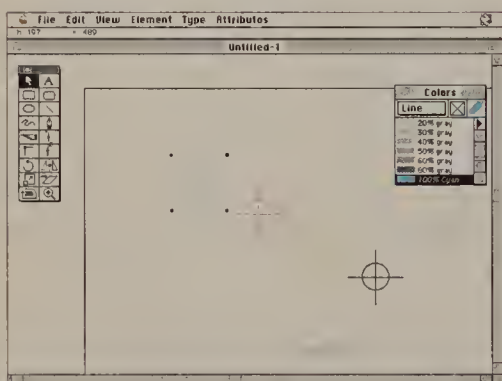
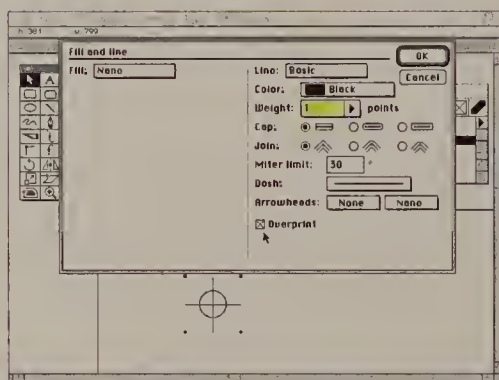
Making Registration and Crop Marks

Sometimes you need to make your own registration or crop marks in Aldus FreeHand. For instance, your page size may be too large for FreeHand's standard printers' marks to fit on the paper, or you may have several objects each requiring its own crop marks on one page. Oliver Muoto of Los Angeles suggests the following steps for making registration marks. Aside from the initial construction in step 1, the procedure is the same for making crop marks. This procedure ensures that your crop marks and registration marks appear on each separation when you print spot- or process-color separations.

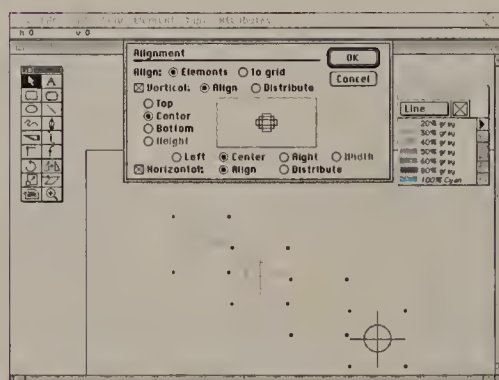


1. Construct a registration mark from a circle and two perpendicular lines. Align the objects with the Alignment command, and group them with the Group command.

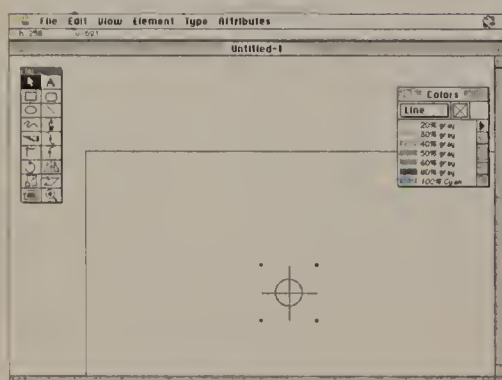
2. Select the grouped registration mark, choose the Fill and Line command, and turn on its Overprint option. This causes the registration mark to print whether it is in front of or behind other objects.



3. Duplicate the registration mark for each spot color—or each of the four process colors if you're making a process-color separation—with the Duplicate command. Then assign one of the spot or process colors to each registration mark.



4. Align all the registration marks so they are centered vertically and horizontally. Their front-to-back ordering doesn't matter.



5. Group the centered registration marks and you've got your own registration mark that will show up on each separation. Duplicate and place as many of these as you like anywhere on the paper. (Three registration marks should suffice.)

every Word 5 window.—L.P.] If your document has multiple sections, only the last section's headers and footers are copied, but the copied headers and footers remain even when you delete the pasted return mark. I first discovered this trick when I copied the last page of a document to a new document in order to transfer style sheets from the old document to the new one. What a time-saver!

*Diana J. Guffy
Huntington Beach, California*

One person's timesaving feature is another person's time-wasting bug. David Rahmel of Los Angeles confidently copied the entire contents of a draft letter with empty headers and footers to his template document with a letterhead logo in the header. To his consternation the empty header replaced his logo header, and he spent half a day figuring out why. To preserve the header, footer, and other section formatting at the end of a Word 5 document, don't paste at the very end of the document. Instead, paste before a blank line or blank space at the end of the document. This precaution is not necessary if you use Word 4, in which you can replace a document's last paragraph mark only by selecting that mark and pasting over it.

If your document has multiple sections whose headers, footers, and other section formatting you want to copy to another document, successively copy and paste each section mark from the source document to the destination document. See the Word manual for more on section formatting.—L.P.

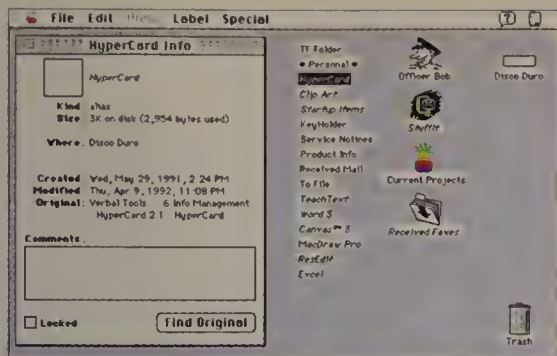
Viewing Desktop Items by Name

TIP When I got System 7, I soon filled up my desktop with aliases of commonly used folders and programs. After a while, I could hardly find the icon for an inserted floppy disk on my cluttered screen. If only I could use the View menu to arrange items on the desktop by name, the problem would be solved. You can get the same effect with System 7's custom icon capabilities. First you open a paint program, select some blank white space, and copy it. Then you use the Finder's Get Info command on each desktop item you want to view by name, and you paste the white space over the icon in each item's info window. As you can see in "Name Only," pasting the white space leaves only the item names visible, and six items without icons fit in the space previously occupied by two items with icons.

*Jeff Eaton
Wheaton, Illinois*

HyperCard Precision

TIP Supposedly all calculations in HyperCard are carried out to 19 significant figures. This is true of all built-in functions. But the precision of user-defined functions depends on the **Number-**



Name Only You can hide desktop icons and fit more items on the desktop by pasting white space over the icon in each item's info window.

Format property. After clicking a button containing the following script, for example, you would expect to see the same number repeated twice in the message box. You see 1.414213562373095049 and 1.4 instead. (The last Put statement in the script puts the values of variables *x1* and *x2*, whose values were calculated by equivalent formulas, into the message box.) To retain the precision, you must reset the **NumberFormat** property.

```
on mouseUp
  set NumberFormat to "0.#"
  put 2*sin(pi/4) into x1
  put f(pi/4) into x2
  set NumberFormat to —
  "0.#####"
  put x1 & " and " & x2
end mouseUp
```

```
function f angle
  return 2*sin(angle)
end f
```

James Hurley
Nevada City, California

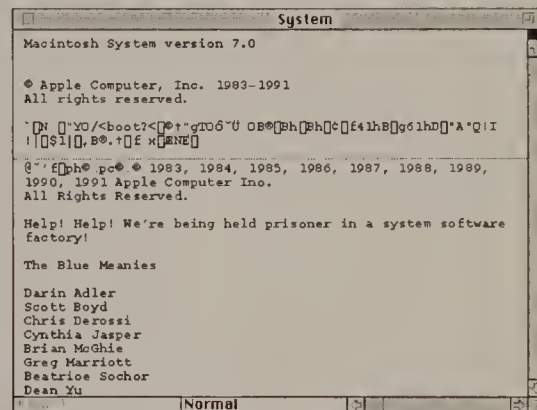
The **return** statement converts the numeric value calculated by a user-defined function into a decimal string using the current **NumberFormat** property. When the **return** statement is executed in the example script, the **NumberFormat** property is 0.#, so HyperCard converts the numeric value 1.414213562373095049 to the text value 1.4. The extra precision is lost at that point and cannot be recovered by subsequently resetting the **NumberFormat** property. The **NumberFormat** property must be reset before the **return** statement is executed, either in the **function** handler or prior to calling the function, to retain precision.—L.P.

PowerBook on Ice

TIP As an editor for *Outdoors* magazine, I received a sample IcePac fishing creel made by Performance Angling (916/894-1004). It was designed for carrying the day's catch or your lunch, but it's absolutely perfect for carrying a PowerBook 100 and its external floppy drive. The PowerBook's AC adapter fits in the IcePac but makes the bag kind of lumpy, so I carry my adapter in my

Message in a Bottle

Eric Apgar of Saratoga, California, found this message in System 7's System file and so can you. Using Microsoft Word (version 3, 4, or 5), you can open any copy of the System File except the one in the System Folder on your start-up disk by pressing the shift key while choosing Word's Open command. If you don't have Word, use a disk editor like Norton Utilities or MacTools. Who are Blue Meanies? They are roving Apple software engineers who contribute to numerous system software projects.



attaché. The IcePac costs \$25 and has a portfolio design with one main pocket and one outside pocket, both with Velcro closures at the top. The bag is made of tasteful green Cordura nylon and has insulated padding and a wide, adjustable shoulder strap. No one's going to slash-and-rip a bag with the words *IcePac* and *Performance Angling* printed in white on the outside, because they'll figure it's your lunch bag and go for your leather attaché. I live in New York. I have to think about things like that.

Gary P. Joyce
Holbrook, New York

Unfortunately, the IcePac isn't quite big enough to satisfactorily accommodate a PowerBook 140 or 170.—L.P.

Updating System 7 Icons

TIP Have you ever decompressed a file only to find it has a generic (blank) icon? You don't really want to rebuild your desktop to fix one icon (especially if you have a large drive). Instead, open the info window for the icon (use the Finder's Get Info command). Click the icon in the info window and a box appears around it, indicating you have selected the icon. Now copy, paste, and cut the icon—in that order. If you are lucky, the correct icon will show its face.

Here's how it works: Copying the icon makes it possible to paste; pasting the icon causes the system to internally mark the file as one that has a custom icon; and cutting the icon causes the system to unmark the file and restore its standard icon. You can't do the cutting step unless you have done the pasting step, and you can't do the pasting step unless you have done the copying step. It doesn't matter what you copy; any graphic will do.

David G. Perkins
Schaumburg, Illinois

I've used this trick to fix TeachText document icons that suddenly and mysteriously looked wrong one day. Fixing one TeachText document fixed all my other TeachText documents. This ripple effect didn't take place immediately but seemed to happen in the background before I shut down.—L.P.

4D Draw Preferences Option

TIP According to the manual for the 4th Dimension Draw module, the command DR Set Preferences has five parameters. It actually has six. The sixth is Confirms, and it determines whether users see a dialog that asks "Do you want to save this drawing?" every time they switch layouts or close a drawing file. You would turn off this parameter if you are handling file saves with your own procedures or if you are displaying drawings as read-only. The correct command syntax is:

DR Set Preferences (Area; Order; PICTs; LockAlerts; Autoscroll; Variable; Confirms)

The Confirms parameter can have one of three values: 0 for off, 1 for on, or -1 for unchanged. The Confirms parameter also works with the DR Get Preferences function.

David Green
Castaic, California

We pay from \$25 to \$100 for tips published here. Send questions or tips on how to use Mac computers, peripherals, or software (by mail or electronically) to *Quick Tips*, Lon Poole, at the addresses listed in *How to Contact Macworld* at the front of the magazine (include your address and phone number). All published submissions become the property of *Macworld*. Due to the high volume of mail received, we're unable to provide personal responses. **m**

LON POOLE answers readers' questions and selects their tips for this monthly column. His two most recent books are *Amazing Mac Facts* (Microsoft Press, 1991), a collection of the best published tips; and *Macworld Guide to System 7* (IDG Books Worldwide, 1991).

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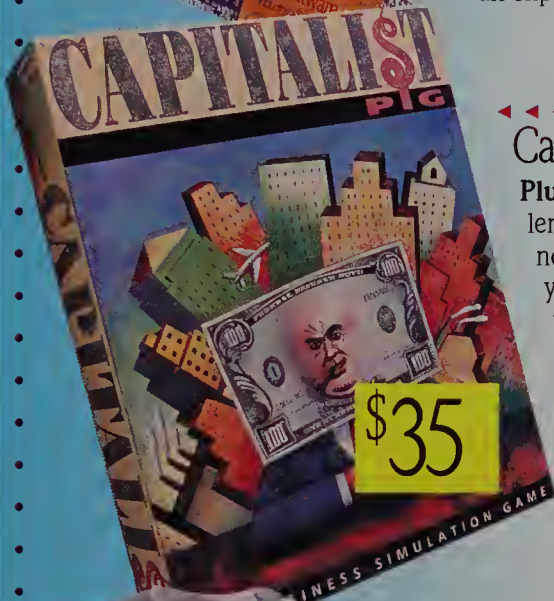


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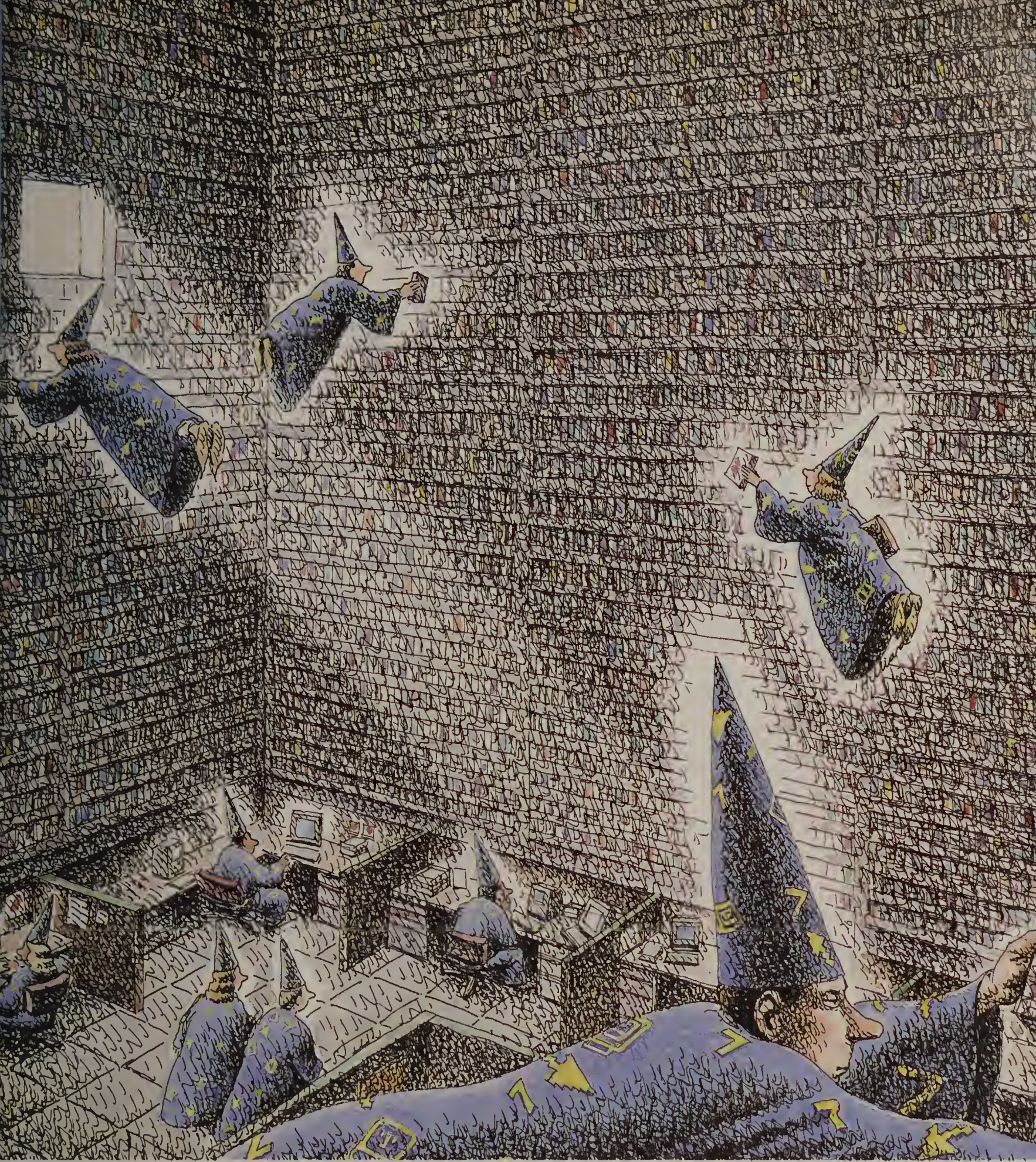
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MAXA Corporation 7 Find problems fast with Snooper, the revolutionary suite of hardware diagnostic and testing tools. Snooper is easy-to-use, powerful and saves you time. No set of Mac utilities is complete without Snooper, the hardware diagnostic. Also available with Nubus diagnostic card for only \$168.

\$128

Double Helix 3.5

Helix Technologies 7 Client/Server Software included in every box! Fastest multiuser relational database for the Macintosh. Its client/server architecture keeps network traffic down and productivity up. Provides real-time updating, giving each user immediate on-screen updated information. Its object-oriented, non-procedural programming environment allows modifications on the fly!

\$458

Voice Navigator II-SW

Articulate Systems 7 New! Voice Recognition is a reality now & affordable too! Provides Voice Recognition for ALL Mac Applications. Work faster & easier using your voice instead of key strokes & pulling down menus. Comes FREE with your choice of a high quality Desktop or Headset Microphone.

\$348

SoftNode 1.0/Universal SoftPC 1.2

Insignia Solutions 7 Add SoftNode to either Universal SoftPC or SoftAT and your Mac will run MS-DOS applications and share programs over a Novell PC Network! With SoftPC, your next IBM computer could be a Macintosh.

\$105/194

Talking Moose/Thunder 7

Baseline Publishing 7 Talking Moose — Brings comic relief to your Mac. Winner of MacUser's 1991 Eddy for Best Desktop Diversion.

Thunder 7 — This handy Desk Accessory checks the spelling of virtually any document either interactively or in batch modes. Thesaurus includes 1.4 million synonyms, antonyms and contrasting and related words.

\$22/55

Disk•Go

Softwriters, Inc 7 Speed, Speed, Speed. Just drop Disk•Go into your System Folder and accelerate your Apple hard disk. On average, Disk•Go increases Apple hard disk speed by 40%. Advanced technology provides immediate acceleration without having to reformat your hard disk. Get Disk•Go now...you've been waiting long enough!

\$45

Disk•Go

Painter 1.2 /6 x 9 Tablet

Fractal/Wacom 7 Painter, the natural media painting program chosen by critics: MacUser Eddy 1991, 5-Mice, MacWeek's Target Award. The Wacom tablet has the premier pressure sensitive stylus. Now specially priced together.

\$698

JetInc. Refill Twin Pack

DGR Technologies For half the cost of an original printer cartridge, JetInc. replenishes your InkJet printer with water-resistant ink that produces clear, crisp, laser-quality impressions. Available in black, blue, red and green. Supports the Apple Stylewriter, Hewlett Packard DeskWriter and DeskJet, and Cannon BJ-10e series printers.

\$17

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Retrieve It!

MVP Software 7 Introducing Retrieve It!, the friendliest Mac text retriever ever. It quickly finds and displays any text anywhere on any of your hard drives, floppies, CD ROMs, or file servers. Retrieve It! can search file names (extremely fast!) and it can search inside of files as well.

JMP Version 2

SAS Institute 7 1991 MacWeek Target Award Winner. Visualize your data to discover meaningful patterns and outliers. 'JMP' to conclusions faster using statistics including ANOVA, regression, MANOVA, 2D and 3D Spin, control charts and more. With new **JMP Design**, \$258, create classical and D-Optimal experimental designs and screens for significant effects and interactions.



\$598



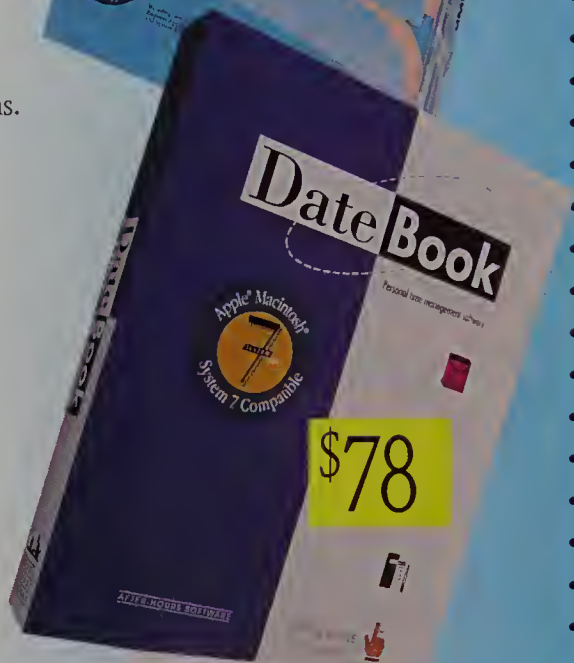
\$14/248

Canvas 3.0

Deneba 7 Supports Publish and Subscribe, Balloon Help, TrueType and custom Apple events. Also offers professional text handling features like character-to-character font scaling, font conversion to Bezier curves and much more. Too many extras to list here. Also for \$14 more get Canvas 3.0: The Book from Peachpit Press.

DateBook

After Hours Software 7 The ultimate personal time manager. Combines calendar, scheduling, alarms and To Do lists to keep track of your daily activities, plus integrates with your TouchBASE database to retrieve complete contact information. Automatically "post" the details of your meetings in DateBook and TouchBASE.



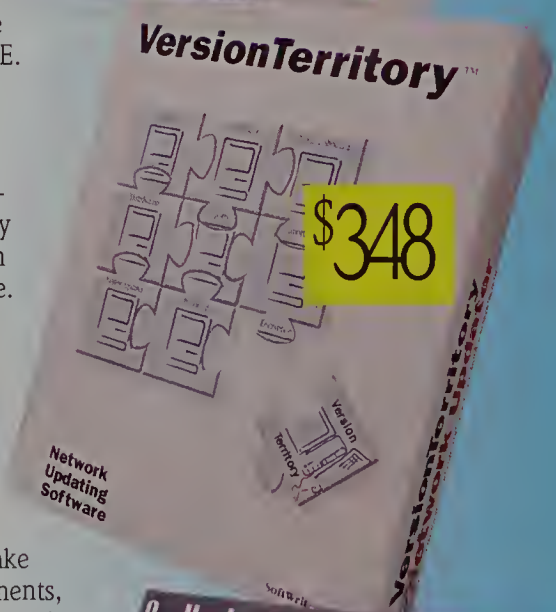
\$78

FAXstf LAN

STF Technologies 7 Provide every Mac on your AppleTalk network with the ability to send/receive faxes using almost any fax/data modem. Background send/receive operation up to 14,400 bps, broadcast capability and much more. FAXstf Universal (single user) \$56 and LC (basic) \$26 also available.

VersionTerritory 2.0 (25-user)

Softwriters, Inc. 7 Imagine updating all of your Macintoshes with the touch of a button. With VersionTerritory, updates that took hours in the past now take just a few minutes. Examine Macintoshes, distribute documents, update software and utilize the power of your network with VersionTerritory.



\$348

Timbuktu 4.0 (single user)

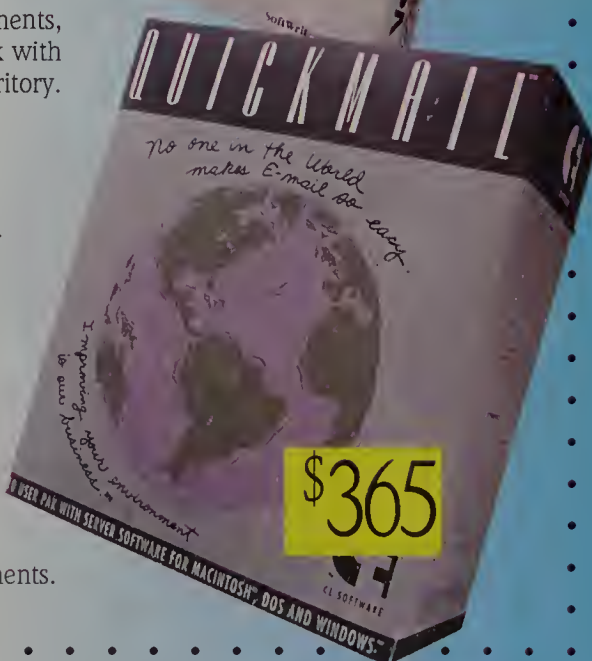
Farallon 7 Observe and share control of any other Mac on your network. So you can tutor new users or troubleshoot problems without leaving your Mac. Easy file transfer needs no server. A full range of security options lets you control user access levels. Timbuktu 4.0 (10-User) \$678.

QuickMail 2.5 (10-user)

CE Software 7 With over 350,000 users worldwide, QuickMail is the leading E-mail system for AppleTalk networks. Now offers the same power and ease of use to DOS, Windows, and OS/2 users in file server environments.



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\$365

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Access CD Allegro

Optical Access Intl. 7 The fastest CD-ROM drive available with a 310 ms. access time. Includes SuperCache software for lightning speed access to large amounts of information. Features headphone jack, stereo RCA type audio connectors, and deluxe desk accessory. Includes cable, sample CD, and one caddy.



\$1,598

Access RD/Aria™

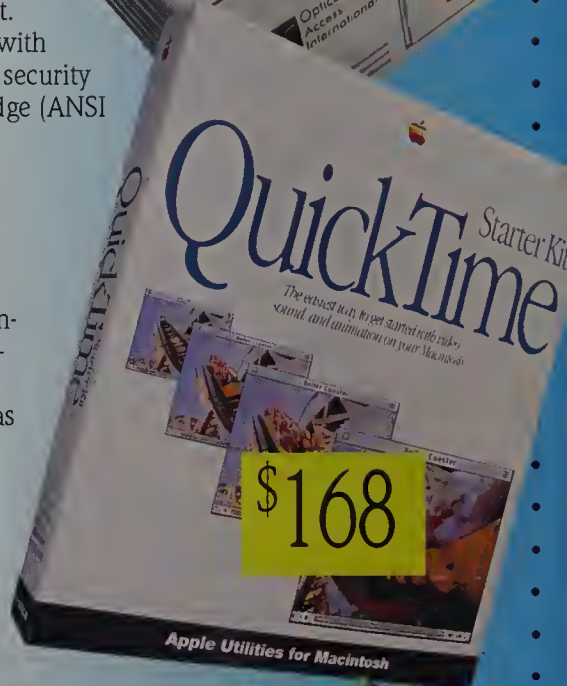
Optical Access Intl. 7 128 megabytes in your shirt pocket. This 3.5" optical drive is the cutting edge of technology, enhances with SuperCache software for lightning fast operation. The ultimate data security and affordability. Includes: cable, and removable 3.5" media cartridge (ANSI compatible).



\$258

PROclaim!

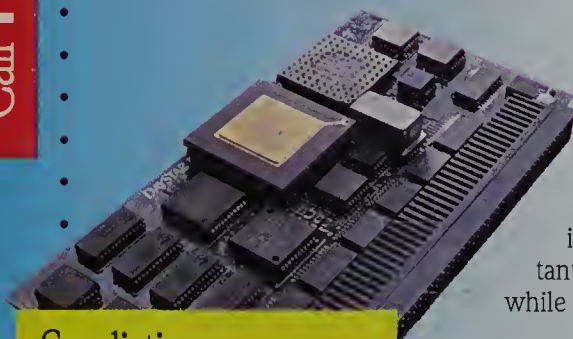
Compact Designs 7 QuickTime CD-ROM. Most complete source of quality multimedia images. Over 600-MB of images includes 250 video clips saved as 24-bit QuickTime movies. Subjects include: Business, Technology, Cities, People, Environment, Military, Space, and much more. Incls. features such as presentation animations and video animated phrases, as well as a user-friendly HyperCard visual directory.



\$168

QuickTime Starter Kit

Apple Computer 7 Contains all the tools to help you get started with the innovative QuickTime software. With QuickTime installed on your Mac, you can work with dynamic information such as video and sound, as easily as you work with text and graphics.



See listings under Hardware

Universal PowerCache Card

DayStar Digital 7 When you feel the need for speed, the award-winning PowerCache gives you the best combination of blazing-fast speeds (up to three times) and cost-effective prices. More important, it's guaranteed 100% compatible with all your software and hardware, while running at full speed.



\$35^{ea}

SIMMs/Mac Memory Book

Mac's Place 7 Expand the memory of your Mac! One Meg SIMM, 80 nanoseconds, only \$35! Four Meg SIMM only \$128! Also included, Connectix Macintosh Memory Guide, the complete guide for RAM configuration, expansion, tricks and traps. Call for PowerBook RAM prices.



\$698

Bernoulli Transportable 90-MB PRO

IOMEGA 7 The best removable solution for your state-of-the-art needs! System 7 and QuickTime require even greater storage demands, but now you simply insert another affordable 90-MB disk—180 with included compression, and you'll never fall short of disk space again.



\$378

Cinematic

Vividus 7 Easily create interactive presentations with professional-quality animation, sound, and QuickTime video. Also animates PowerPoint and Persuasion presentations. Includes painting tools, the CinePlayer, a HC-XCMD to control movies, and 12-MB of animation, templates, and sound.

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MOTION WORKS PROMOTION

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PROMotion

Motion Works 7 Easily create full color animations with multiple audio tracks, even if you can't draw. Interface follows traditional animation techniques such as cel based actors, onion skinning and path based motion. Other features include cel tweening and Print to Video. Export your animations to QuickTime™ or Berkeley Systems After Dark.

DP + Hard Drives

DataPlace 7 Available only at Mac's Place! These quality Quantum hard drives and Syquest Removable Cartridge drives come with Alys Software's More Disk Space, Central Points MacTools Deluxe and Nova's Kaboom! Special Edition. Each drive features a selectable SCSI ID switch, two 50 pin SCSI connectors, an external fuse and two AC Plug-ins.

See listings under Hard Drives

DiVA VideoShop

DiVA 7 DiVA VideoShop is a fun, easy and powerful application for creating and editing QuickTime movies. Used with any QuickTime digitizing board, DiVA VideoShop's recording module lets you record video and audio clips directly onto your hard disk. For ease of editing, DiVA VideoShop uses micons (moving icons) to represent each clip. You can incorporate clip media from the Image Bank CD Collection of 300 movies, 70 music scores, and a sound effects library, all included in the box. *Special Bundles:*

VideoShop and RasterOps 24STV.....\$1172.
VideoShop and SuperMac Video Spigot NuBus.....\$798.

\$398

Interactive Training - MacroMind Director

Media In Motion 7 The comprehensive computer-based interactive course designed to help individuals learn MacroMind Director in just one session! Complete instruction on Director 3.0 and 3.1 including all key components, cast creation, scripting QuickTime™ and more. Save time and guarantee your proficiency in using Director.

\$125

Director 3.1

Macromedia 7 New Version! The professionals choice for multimedia production is now the ultimate QuickTime authoring tool. Author, edit, playback and export interactive QuickTime movies with no additional hardware. Other features include expanded help, added functionality in the Score, a \$195 Accelerator, and license free distribution of your multimedia productions.

\$848

CameraMan

Vision Software 7 New! Make a full-color movie of whatever's happening on your Mac screen with CameraMan! Records all screen activity in real-time to a QuickTime™ or PICS movie. Use your screen movies in multimedia, presentation, and QuickTime™ packages. Free movie player included!

\$98

Audioshop

Opcode Systems 7 Records and edits Macintosh audio and offers control of CD-ROMs. Fun to use and easy to understand, since the interface resembles a home CD player. Includes powerful editing features and even adds special effects like echo. Supports all popular Mac sound formats for easy integration with other programs.

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Articulate Systems	
Voice Navigator II	548.
CoStar Corporation	
Stingray Trackball	88.
DataDesk	
Mac 101E (All Macs)	126.
Fellowes Diskette Holders	
Oak (Holds 45)	19.
Oak (Holds 120)	31.
InCom	
Compu-Case PowerBook Bag	78.
Kensington Microware	
7' Long ADB Keyboard Cable	24.
TurboMouse ADB	107.
Key Tronic	
Mac Pro Plus	138.
L B Innovators, Inc	
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WristSaver	12.
WristSaver Mouse Pad	12.
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Mac's Place Speed Pad	7.
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High Density 10 Pak	15.
High Density-Bulk 50 Pak	60.
DG 90 2gig DAT Tape	22.
Sophisticated Circuits	
PowerKey 2.0 w/QuickKeys Lite	75.
Solidex	
Performance Case-PB	88.

BUSINESS

ACIUS	
4th Dimension V2.2	518.
AEC Management Systems	
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After Hours Software	
TouchBASE	79.
Aldus	
Persuasion	318.
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System 7 Personal Upgrade	98.
System 7 Group Upgrade	278.
AppleShare Server	1038.
AppleTalk Remote Access	174.
Macintosh PC Exchange	78.
Ark Interface, Inc	
Workspace	79.
ASD Software	
Active Memory Single User	125.
Active Memory 5 User	314.
WindoWatch 1 User	88.
Attain Corp.	
In Control	94.
Bananafish Software	
ThoughtPattern	94.
Beagle Brothers Inc.	
BeagleWorks	184.

Competitive Upgrade	94.
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Ceres Software	
Inspiration 3.0.1	158.
CheckMark Software	
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MultiLedger 2.0	225.
Payroll	174.
Claris	
CompuWorks	198.
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HyperCard V2.1	139.
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MacWrite II	88.
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CompuServe Membership Kit	25.
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Computer Associates	
Cricket Graph 1.2.3	84.
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DeltaGraph Professional	198.
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Control Classic	298.
DiscTech Corp.	
Facilitator	218.
Elefant	
RateFinder	88.
Freeware Company	
White Knight V11	85.
Insignia Solutions	
AccessPC	59.
Soft PC	
Entry Level V2.5	125.
Universal V2.5	194.
AT V2.5	298.
Intuit	
Quicken 3.0	40.
JIAN	
BizPlanBuilder	94.
LivingTrustBuilder	94.
Lotus Development	
Lotus 1-2-3	338.
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Micro Planning Intl.	
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ProVUE	
Panorama II	238.
Reality Technology	
Wealth Builder	94.
SoftSync	
Accountant Inc.	335.
Accountant Inc. Multi-User	568.
Software Ventures	
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Spider Island Software	
TeleFinder Unlimited Ed.	272.
SuperOffice Corp.	
SuperOffice 1 User	228.
Survivor	
MacMoney	58.
Symantec	
GreatWorks 2.0	198.
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PowerBundle	158.
WriteNow 3.0	154.
Teleware	
M.Y.O.B.	139.
Timeslips Corporation	
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Accounting Link (TAL)	52.
Westware	
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Wolfram Research Inc.	
Mathematica Standard 2.0	498.
Mathematica Enhanced 2.0	788.
WordPerfect Corp.	
WordPerfect V2.1	278.
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American Heritage Dict.	55.
Correct Grammar	55.
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GRAPHICS

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Premier	328.
Streamline 2.0	117.
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Gallery Effects	128.
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MacDraw Pro	278.
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Model Shop V2.0	598.
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Motion Works	
PROmotion	248.
Pixar	
Showplace/MacRenderMan	629.
Quark Incorporated	
XPress 3.1	558.
Ray Dream	
JAG	78.
Ray Dream Designer 2.0	589.
Specular International	
Infini-D	648.
Replicas Vol. 1 or 2	188.
Strata, Inc.	
StrataVision 3D V2.5	628.
Timeworks	
Publish It! Easy	145.
Competitive Upgrade	99.
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CD/Allegro (310 ms)	648.
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<i>Optical Read/Write</i>	
Access/MF Gigabyte	2995.
RD/Aria-128 MB	1598.
PhotoDisc Inc.	
PhotoDisc Vol I or II	278.
Pixar	
Showplace/MacRenderMan	448.

Quantum Leap	
CD-7 Super Library 2 Disk Set	72.
Giga-ROM 2.0-Super Library	98.
Macademic-Education Library	73.

EDUCATIONAL

Broderbund	
Kid Pix V1.2	37.
Kid Pix Companion	Call
Nigel's World	36.
Spelunx	29.
The Playroom V2.0	29.
Compu-Teach	
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Once Upon A Time-Vol. I-III ea.	34.
Davidson & Associates	
Alge-Blaster Plus	36.
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Learning Company	
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OutNumbered!	36.
Reader Rabbit 1 V3.0	35.
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ENTERTAINMENT

Activision	
Lost Treasures of Infocom	40.
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Baseline Publishing	
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Carmen San Diego?	
Europe, Time, U.S.A., World ea.	29.
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SimCity	29.
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Strategic Conquest 3.0	35.
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HARDWARE

Applied Engineering	
7 AEHD Superdrive	219.
7 FastMath LC(68882 16Mhz)	108.
7 Plus Drive	308.
7 QuadraLink w/AE Shadow	199.
7 QuickSilver IIsi	198.
<i>TransWarp Accelerators</i>	
7 CI 50Mhz w/FPU	1578.
7 LC 33Mhz w/FPU	998.
7 LC 40Mhz w/FPU	1378.
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7 10T Hub/8	258.
7 10T Hub/12	548.
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7 EN/SC	328.
7 EN/SC PowerBook	368.
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7 EN/SC-10T PowerBook	288.
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7 Typist + Graphics	468.
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Dayna Communications	
7 DaynaPORT SCSI/Link PB	298.
7 DaynaPORT SCSI/Link-3 PB	348.
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7 EtherPrint-T	338.
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7 E/II	148.
7 E/II-T	148.
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7 E/si-TFP	248.
7 E/ZT (External)	278.
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7 PowerMath LC	118.
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Desktop Publishing Techniques

BY JIM HEID

TODAY'S DESKTOP PUBLISHING programs are capable of turning out top-quality publications. But are you? If you were a publishing professional before the Mac appeared, chances are you've made the transition to the desktop without too much pain. But if you're new to publishing, you might be overwhelmed by the array of options in programs such as Aldus PageMaker and QuarkXPress. Kerning, tracking, letter spacing, spot color, smart (curled) quotes—it's almost enough to make you long for the old Selectric.

Some publishing neophytes address this onslaught of features by ignoring it, relying on their program's default settings for page size, spacing, and the rest. As a result, many desktop publications look like desktop publications—the efforts of someone with a powerful program but without the knowledge to fully apply it.

Fortunately, it's not too difficult to take the "desktop" out of desktop publishing. This month, I spotlight several techniques for adding polish to publications. The instructions here apply to QuarkXPress 3.1 and PageMaker 4.2, but similar concepts apply to all publishing programs, and even to some word processors.

Page-Size Decisions

ONE OF THE MOST BASIC DECISIONS behind any publication is the choice of page size, or *trim size*. Chances are you frequently opt for *portrait*, or *tall*, the 8½-by-11-inch page size offered by QuarkXPress and PageMaker. After all, that's probably the largest paper size your laser printer can handle, and it's the most common size used by printshops.

But before okaying that New dialog box, consider the options. For starters, consider a *landscape*, or *wide*, orientation—11 by 8½ inches. It might work well for a small poster, for a publication with wide graphics, or for a calendar.

If you're a bit more ambitious, consider turning that letter-size sheet into a two-sided job. By folding the sheet two or three times, you can create an attractive booklet, menu, or brochure. A two-sided job costs more to print, but it's impossible to say just how much more. The cost of a print job depends on many factors, includ-

ing the quantity you print, the paper you use, the number of printers in your area, and the type of equipment each printer has. It's a good idea to get several estimates. If you're printing a small run on your laser printer, investigate the wide selection of specialty papers available from mail-order houses such as Paper Direct (800/272-7377). Besides stiff *card stocks*, Paper Direct also sells paper preprinted with splashes of color and patterns around which you can structure your design.

You can produce tabloid-size or even billboard-size publications by using your program's *tiling* feature. Simply specify the final page size when setting up the document, and then activate the tiling option when you print. The program divides the large page size into a number of letter-size pages that you can tape together or paste up on layout board. A large size such as tabloid (11 by 17 inches) costs more to print than a letter-size publication, but again, it's impossible to provide specific percentages.

One more large-output tip: many copy shops have blueprint photocopiers that accept originals up to a few feet wide, with no length limit. You can produce some mighty impressive banners by using tiling and then photocopying the assembled page.

How to: QuarkXPress To specify a wide page orientation, type the appropriate dimensions in the New dialog box's Width and Height boxes. To use tiling, first specify the final page size in the New dialog box. When you're ready to print, choose Print and then click on the Manual or Auto tiling button, depending on the desired tiling scheme.

How to: PageMaker Click on the Wide button in the Page Setup dialog box. To use the tiling feature, first specify the final page size in the Page Setup dialog box. When you're ready to print, choose Print and then click on the Options button. Choose the Tile option in the Aldus Print Options dialog box. PageMaker is preset to overlap .65 inch of the publication on each page to help you as-

semble the tiles. You can change that overlap amount or specify manual tiling, which lets you determine how to divide the page. Manual tiling is useful when you don't want a graphic or line of text to be divided across two tiles.

Are You Typographically Correct?

THE EASIEST WAY TO SPOT A DESKTOP published job is to look at the punctuation. Are the quotes and apostrophes "curled" (like these), or are they those tacky "typewriter" quotes (like those)? Are there two spaces after periods (the style taught in Typing 101) or just one (the typographically correct style)? Also look for double hyphens--how gauche--which should be true *em dashes*—that's better.

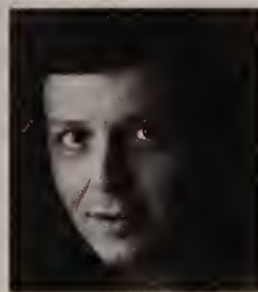
PageMaker and QuarkXPress translate typewriter quotes and double hyphens found in word processor files into their typographically correct counterparts. This translation occurs automatically when you *import* the word processor file.

But automatic punctuation conversion doesn't address text that you type directly within the publishing program, such as headlines and last-minute corrections. You can use PageMaker's *smart quotes* option to automatically convert quotes as you type, but that won't guard against double word spaces or double hyphens. That's your job. If you use QuarkXPress, you have to remember to use the finger-tangling key sequences that summon quotes as well as dashes. Or give your ten-

digits a break and use one of the keyboard-modifying system extensions available through user groups and on-line services (see "Smart Punctuation Made Easy").

How to: QuarkXPress To have QuarkXPress convert quotes and double hyphens when importing text, choose the Convert Quotes option in the Get Text dialog box. QuarkXPress has no option for converting quotes as you type or edit text, but it does have an option that automatically generates *ligatures*—connected character pairs such as *fi* and *fl*—as you type or import text. To use this option, choose Ty-

continues



*How to
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publications
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pographic from the Preferences submenu (in the Edit menu). In the Typographic Preferences dialog box, choose the On option from the Ligatures pop-up menu.

How to: PageMaker Choose the Convert Quotes option in the Place dialog box. To specify that PageMaker convert quotes as you type or edit text, choose Preferences from the Edit menu and then click on the Other button to display the Other Preferences dialog box. Finally, choose Use Typographer's Quotes.

Better Spacing, Part I: Tracking and Kerning

TO DETERMINE HOW MUCH SPACE TO put between words and characters, a publishing program relies on information built into a font. This spacing data is designed to (and usually does) produce attractive results within the range of *body text* sizes—roughly 8-point to 12-point. But with larger sizes, the spacing between characters and words can appear exaggerated. By using your program's *tracking* and *kerning* features to tighten spacing, you can improve the legibility of headlines (see "Tracking and Kerning").

A tracking feature automatically adjusts the spaces between selected charac-

When set in narrow column widths, justified type is prone to spacing problems that impair legibility and make the reader work harder.

When set in narrow column widths, justified type is prone to spacing problems that impair legibility and make the reader work harder.

Clear the Rivers Note the river of space that runs through the second, third, and fourth lines of the example on the left. At right, the problem is fixed by hyphenating a word.

But NASA's greatest triumph came 2-1/2 years later, with the 1969 launch of Apollo 11.

But NASA's greatest triumph came 2½ years later, with the 1969 launch of Apollo 11.

Expert Characters Expert-edition fonts contain additional characters such as true small capitals; fractions; and old-style numerals, which have ascenders and descenders. Adobe's Minion is shown here. Top: The large capitals overwhelm the surrounding lowercase characters, the phony fraction looks tacky, and the numerals break up the rhythm of the line. Bottom: Small capitals make acronyms less acrimonious, and the true fraction and old-style numerals add a touch of class.

Smart Punctuation Made Easy

You can add a smart (curled) quotes feature to any program by using a free system extension called SmartKeys, written by Maurice Volaski and available through user groups and online services. SmartKeys not only converts quotes as you type, it also optionally converts double hyphens into em dashes, uses ligatures when available, and prevents you from typing more than one consecutive space.

Note that most online services can't recognize smart quotes and em dashes, so if you're creating electronic mail, you may need to disable your keyboard's smarts. SmartKeys makes this easy by allowing you to specify a list of programs in which its conversion features should be disabled.

If you can't find SmartKeys, look for Quote Init, a \$15 shareware extension that performs the same basic functions, but not as elegantly.

ters. With small sizes, spacing is increased to open up the text and make it less dense. In large sizes, spacing is decreased to tighten up the text. It's this latter aspect of tracking that is useful for headlines.

Kerning involves adjusting the spaces between only certain character pairs. Kerning features come in two flavors: *manual* (you specify how much space to add or remove and from where) and *automatic* (the program removes space from certain letter pairs such as *To*, based on information built into the font you're using). Automatic kerning adds polish to body text, but for large headlines, you'll want to use manual kerning to achieve the best look. But don't kern too tightly; characters should not touch. You might need to zoom in on the characters you're kerning to see the results.

Better yet, try printing a test page on the printer you'll be using for final output, since resolution varies depending on the resolution of the output device.

How to: QuarkXPress QuarkXPress offers just one track—though it is customizable. To activate tracking, you must also turn on automatic kerning—choose Typographic from the Preferences submenu, then choose Auto Kern Above. (As with PageMaker, you can specify a type-size threshold for automatic kerning.)

To manually remove space between characters, place the blinking insertion point between two of them (or highlight a range of characters), and then press ⌘-shift-{ or, to achieve finer kerning, ⌘-option-shift-{ (see "Kerning from the Keyboard"). You can also click on the kerning arrows in QuarkXPress's measurements palette, or type a kerning value in the area to the right of the kerning arrows. Type a negative value (for example, -2) to reduce the spacing.

How to: PageMaker PageMaker sports the best tracking features of any publishing program, offering five tracking commands ranging from Very Loose to

Very Tight. (However, unlike QuarkXPress's track, PageMaker's tracks can't be customized unless you buy a utility such as Edco Services' PMtracker. What's more, PageMaker includes tracks for only the 35 fonts built into most laser printers.) For tightening headlines and other large-size elements, try the Normal track for starters. As for kerning, PageMaker is preset to automatically kern sizes above 12-point; you can change that size value using the Spacing Attributes dialog box—choose Paragraph from the Type menu and then choose the Spacing option. (Specifying a smaller value slows PageMaker's performance at formatting body text.) In PageMaker, automatic kerning is a paragraph-level attribute—you can turn it off or on for a given paragraph. To use (or disable) automatic kerning for a range of paragraphs, select those paragraphs before choosing the Paragraph command.

For several methods of manually kerning two characters, see "Kerning from the Keyboard." You can also kern a range of characters using the same techniques; simply select the characters first.

Better Spacing, Part II: Justified Type

THE TYPE IN NEWSLETTERS AND MAGAZINES is often *justified*—aligned against the left and right margins. To justify text, a program adds space between characters and words. And therein lies the potential for poor spacing. With narrow columns, a program often has to insert too much space between words or characters, resulting in distracting *rivers* of white space (see "Clear the Rivers").

With a word processor, there's little you can do to avoid rivers aside from hyphenating the text so that more fits on each line. (You can also reduce the point size or increase the column width, but these measures may compromise the original design.) But publishing programs *continues*

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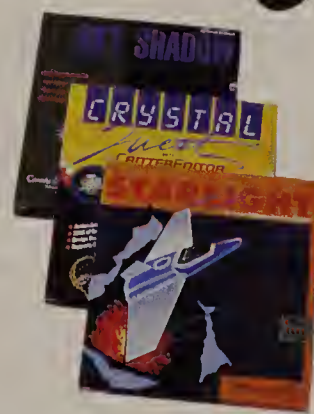
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give you far more control over interword and intercharacter spacing. By tweaking your *H and J*—hyphenation and justification—settings, you can keep those rivers within their banks.

Both QuarkXPress and PageMaker allow you to specify three characteristics for spacing: minimum, the least amount of space that can be put between characters or words; optimum, or desired; and maximum, the largest allowable amount of intercharacter or interword spacing. By adjusting any or all three of these settings for both word and character spacing, you can finely control how text is justified.

There are no specific settings that guarantee good justification. Increasing the maximum amount of letterspacing results in fewer large spaces between words, but too much letterspacing can make words appear to run together. Decreasing the space between characters allows more text to fit on a line, but the text can appear too dense. Experiment to find the ideal spacing settings for a specific job.

Another way to fix a spaced-out line is by hyphenating. QuarkXPress and PageMaker have automatic hyphenation features and also enable you to manually insert *discretionary*, or *soft*, hyphens. A discretionary hyphen tells the program, "If the letters to the left will fit on the pre-

vious line, then divide the word here and insert a hyphen. If they won't fit, then don't divide the word." If reformatting or editing changes the line break, the hyphen disappears but the discretionary hyphen code remains.

How to: QuarkXPress QuarkXPress calls a set of spacing and hyphenation specifications an H&J, and lets you create as many H&Js as you like. To edit the standard H&J (the default that's applied to text unless you specify otherwise), choose H&Js from the Edit menu and then double-click on the H&J named Standard. Specify the desired spacing settings in the subsequent dialog box. To create a new H&J, choose H&Js and then click on the New button. If you modify or create an H&J when no documents are open, your changes will be available in all future documents you create.

To create a discretionary hyphen, position the insertion point at the possible word break and then press ⌘-hyphen.

How to: PageMaker To change the spacing settings for a given paragraph, select the paragraph and then choose Paragraph from the Type menu. In the Paragraph Specifications dialog box, click on the Spacing button. Type the desired spacing values in the appropriate boxes. To change the default spacing settings for an entire document, use the Paragraph command when no text is selected. To change the defaults for all new documents, use the command when no document is open. To insert a discretionary hyphen, position the insertion point at the possible word break and then press ⌘-hyphen.

PageMaker has a unique feature that highlights lines with bad spacing, making it easier to spot them. To activate it, choose Preferences from the Edit menu and then choose the Loose/Tight Lines option under Show Layout Problems.

A Spot of Color

A GOOD WAY TO ENLIVEN A PUBLICATION is with color. I'm not talking about full-color photographs or illustrations, which can be technically complex to work with and expensive to print, but *spot color*—adding color to elements such as headings, lines, and boxes that would otherwise be black. Using spot color is an easy way to add emphasis and pizzazz to a page, and it doesn't require any exotic hardware. You can even work with spot color on a monochrome Mac such as a Classic, although you obviously won't see

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Kern Option

Key Sequence

PAGEMAKER

Tighten, coarse	⌘-left arrow or ⌘-delete
Tighten, fine	⌘-shift-left arrow or option-delete
Loosen, coarse	⌘-right arrow or ⌘-shift-delete
Loosen, fine	⌘-shift-right arrow or option-shift-delete
Remove all manual kerning	⌘-option-K or option-shift-keypad clear or ⌘-option-shift-delete

QUARKXPRESS

Tighten, coarse	⌘-shift-{
Tighten, fine	⌘-option-shift-{
Loosen, coarse	⌘-shift-}
Loosen, fine	⌘-option-shift-}

the colors on screen.

When you print a publication containing spot color, you tell the program to print a separate page, or *overlay*, for each spot color you use. You then supply these pages to the printshop, which will create a printing plate for each color.

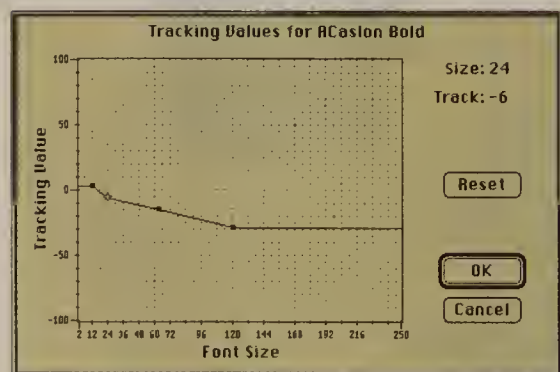
Because a multicolor job must be run through a press more than once (or through a press capable of printing more than one color at once), it costs more than if you use just one color. Costs for multicolor jobs can vary dramatically from one printer to the next. If one printer has a press designed to print two-color jobs, you'll get a better price than if you use a printer that runs the publication through a one-color press twice. If you're producing a limited run on a laser printer, you can add spot color by hand using Letraset's ColorTag color foils (see "Getting Started with Print-Output Media," *Macworld*, September 1991).

Just as paint stores use standardized swatch books, the printing industry uses standardized color-matching systems that let you choose hues. One of the most popular is called the Pantone Matching System. Both PageMaker and QuarkXPress let you assign Pantone colors and see them on a color monitor. When you take your artwork to the printer, you specify by number which Pantone colors you want—as in Pantone 350.

In both PageMaker and QuarkXPress you assign color to elements by clicking on a *color palette*. Normally, the palette lists only a few basic colors such as red, green, and blue. You need to use a command to add other colors to the palette.

How to: QuarkXPress To add a Pantone color to QuarkXPress's color palette, choose Colors from the Edit menu and then click on New. In the Edit Color dialog box, choose Pantone from the Model pop-up menu. Select the desired Pantone color and then click on OK. Finally, click on the Save button in the Colors dialog box. To assign a color to text or to a graphic element, select the text

Away Today Away Today Away Today



Tracking and Kerning To improve headline spacing, start by tightening overall spacing, then selectively kern where necessary. A 24-point Helvetica Bold headline with no kerning (top); PageMaker's Normal track option tightens overall spacing (middle); selective manual kerning finishes the job (bottom). QuarkXPress has a tracking editor (shown here) that lets you specify how the program should loosen or tighten spacing depending on the type size. This sample track illustrates how tracking works: as the type size increases, so does the amount of space removed between characters.

or element and then click on the color name in the color palette. (If the color palette isn't visible, choose Show Colors from the View menu.) To print the separations for each color, choose Print and choose Make Separations. To help the printshop align the plates correctly, you might also want to choose the Registration Marks option.

How to: PageMaker Choose Define Colors from the Element menu and then click on New. In the Edit Color dialog box, click on Pantone, and then select the desired color and click on OK. To assign a color to text or to a graphic element such as a rule, select the text or element and then click on the color name in the color palette. (If the color palette isn't visible, choose Color Palette from the Windows menu.) To print the overlays for each color, choose Print from the File menu and then click on Options. In the Aldus Print Options dialog box, click on the Spot Color Overlays button.

Next Steps

IF YOU'RE COMMITTED TO MAKING publications look professionally typeset, you might want to investigate the *expert sets* sold by Adobe and other font vendors. Expert sets include special characters not found in most fonts, including true small capitals, old-style numerals, and fractions (see "Expert Characters").

For more advice on using type, see the four-part series that appeared in *Macworld* last year, starting with the July 1991 issue. For general advice on publication design, I recommend *Graphic Design for the Electronic Age*, by Jan V. White (Watson-Guptill Publications, 1988).

Most publishing programs include a library of predesigned *templates* for common types of publications, including newsletters, brochures, invoices, and books. PageMaker includes an especially attractive template library; the *Templates Guide* manual has tips for modifying the templates to suit your needs.

Perhaps a future generation of publishing programs will have the smarts to handle many design and typographic chores for you. Until then, you must make the same decisions that designers and typesetters have been making for centuries, decisions aimed at one goal: conveying your message in an appropriate, aesthetically pleasing way. **m**

See *Where to Buy* for contact information.

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest books are *Macworld Complete Mac Handbook* (1991) and *Macworld Guide to Microsoft Word 5* (1992), both published by IDG Books Worldwide.

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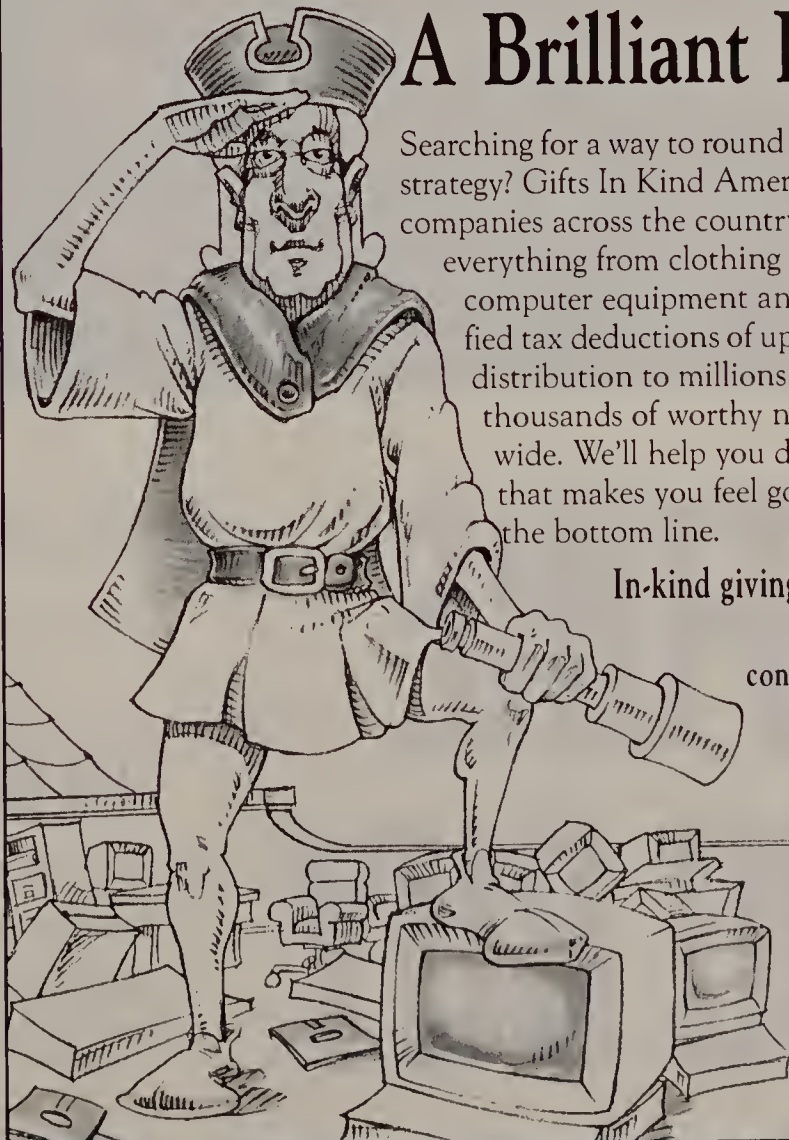
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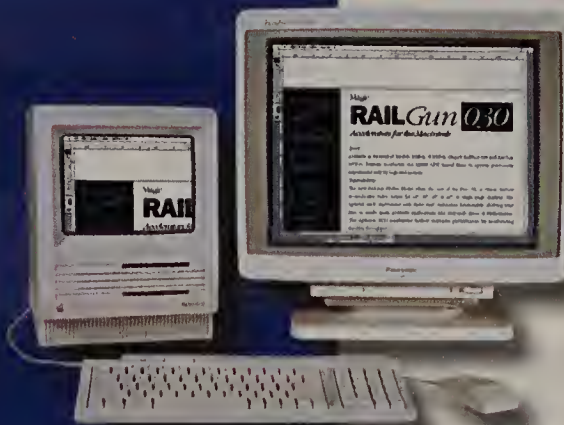
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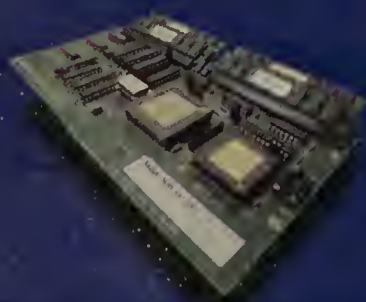
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BY PHILIP CHIEN

Connecting Your Mac with the Rest of the World

With a modem, your Mac can communicate with the rest of the world. White Knight (née Red Ryder and available from The FreeSoft Company, 412/846-2700; fax 412/847-4436) has been the definitive general-purpose communications program for the Mac. It became popular among power users because of its versatility, and it has also become a fairly easy program for beginners. If you have used special-purpose communications programs and want more flexible capabilities, White Knight can open up a new world for your Macintosh, and the tips below should help you on your way.

Failure to Communicate

The biggest problem with telecommunications, with any computer or program, is protocols—getting the two computers to understand each

other. There are dozens of different parameters, which combine in thousands of different ways and which must be set properly for two computers to communicate. Fortunately it's easy to figure out the correct permutation if you know a bit more about the parameters.

Both modems must communicate at the same speed. It should be fairly obvious that when two different modems are communicating, the slower of the two is the limiting factor—if a 2400-bits-per-second (bps) modem calls a 1200-bps system, the maximum data-transfer rate is 1200 bps. Choosing Serial Port Settings from the Edit menu (⌘-U) and setting White Knight's speed (called baud rate) to match the speed of the other system should solve the problem (see "Serial Port Settings").

Both modems should use the same data format. The data format includes the number of

data bits, *stop bits*, and *parity*. Over 99 percent of all systems use 8 data bits, no parity, and 1 stop bit (often abbreviated as 8-N-1). Other data formats should be used only if specified by the other system.

A more confusing term is *duplex*. With *full duplex* mode, when you type a character into the computer, that character doesn't appear on your screen. The communications software sends the character to the other computer, which sends back the same character to acknowledge its receipt. Your computer then displays that character on your screen, along with the rest of the data received. If you are connected to the other computer via a satellite link, your characters appear on your screen approximately half a second after you type them, which can be confusing. With *half duplex* mode your computer displays its own characters as it sends them to the other computer, but gives you no way to confirm that the computer received them properly. If your duplex mode is set incorrectly you will get either double characters lliikkee tthhiiss, or no text at all. The simple solution (which works most of the time) is if you get double characters, change the duplex mode from full to half, and if you can't see what you're typing, change the duplex mode from half to full.

White Knight offers various ways to deal with control characters. The most com-

monly used control characters are defined in the table "Common Control Characters."

Modem Setup

The Serial Port dialog box (⌘-U) includes a command that the Mac sends to your modem each time you run White Knight. This command typically is an exotic hieroglyphic like ATE1Q0V1. This particular command gives the modem three instructions. **AT** is the attention code used by Hayes-compatible modems to indicate that a set of commands follows. **E1** instructs the modem to echo back each character that it receives. **Q0** tells the modem to send back status reports. **V1** instructs the modem to send the status reports as English text (for example, CONNECT 1200 instead of status 5). White Knight uses these commands to monitor your modem's status; you shouldn't modify them, but you can add commands to make your modem more versatile. For example, to avoid disturbing others, use the command **M0** to shut off the modem's speaker. Use it with care, though, since you won't be able to hear when a connection is made. The command **S0=1** tells the modem to answer the phone on the first ring, and **S0=0** tells the modem to ignore incoming calls. Other commands can be used to set up international dialing

continues

Serial Port Settings



White Knight's Serial Port dialog box is used to set up speed and communications parameters.

COMMON CONTROL CHARACTERS

ASCII	Control Character	ASCII Purpose	ASCII Mnemonic
3	C	end of text	ETX
7	G	send bell	BEL
8	H	backspace	BS
9	I	horizontal tab	HT
10	J	line feed	LF
12	L	form feed	FF
13	M	carriage return	CR
17	Q	device control 1 (XON)	DC1
19	S	device control 3 (XOFF)	DC3

parameters, control sequences, and a variety of other options. Better modem manuals include an explanation of the different AT commands.

When you are offline (not connected to another computer) you can type in AT commands directly from White Knight, and White Knight will show the modem's responses, which are typically verifications of your changes. If you're online with another computer, you can go to the command mode by waiting for a couple of seconds, typing three pluses (+++), and then waiting another couple of seconds until the modem responds with "OK." The purpose behind the wait is to prevent three pluses in a normal document from accidentally putting the modem into the command mode. After you finish sending commands to the modem, typing **ATO** puts you back online.

One use for sending direct commands is when your modem is connected to another user's modem and you want to temporarily shut off the modem to talk on the phone with that user, but you wish to continue sending data after you finish talking. Both users should instruct the modem to go into command mode, pick up the telephone, and instruct the modem to hang up (by typing **ATH** or choosing Hang Up from the modem submenu under White Knight's Service menu). To continue sending data one user should type **ATA** to tell the modem to pick up the phone and give a carrier, and the other user should type **ATO** to respond to that carrier. Both of you should then hang

up and proceed with the modem communications.

Besides calling other computers, you can have other computers call you. If you don't have auto-answer (**MA**) turned on, you can instruct the modem to pick up the phone manually by typing the **ATA** command. Once you connect with another computer you should type a greeting message on your computer and verify the communications parameters.

Using MacBinary

MacBinary is a file format that bundles the hidden portions of Mac files that help the Mac recognize the files. Most users never have to worry about resource forks or Finder information, but when you transfer a file from one computer to another, especially via a computer that's not a Mac, some of the Mac-specific elements of the file can get lost. The most common symptom of an improperly transferred file is a blank icon that can't be opened by any of your applications. Saving a file in MacBinary format ensures that all of the file's elements remain intact, even if the file is uploaded from a Mac to a mainframe computer and then downloaded to another Mac.

White Knight supports the MacBinary format, but gives you the option not to use it (**OF**). Why would you not want to use MacBinary? If you are transferring a generic file (such as a text file) for use on other computers, then you probably don't want to use MacBinary. White Knight

gives you the option to use MacBinary always, never, or with all files except text files.

Talking to Non-Macs

White Knight can also communicate with other types of computers. They can connect to the Mac via modem or directly, with a special serial cable, if the systems are physically close enough. To connect two computers directly you need the normal cables used to connect each computer to a standard modem, and a modem eliminator with two female connectors. A modem eliminator lets two computers connect without a modem. Once the cables are hooked up, White Knight and the other communications program act like they've already called each other. Since the computers are connected directly, the programs can be configured for their fastest speeds.

Programs can only be shared by compatible operating systems (for example, a Macintosh HyperCard stack will not run on other types of computers); however, data files (word processor documents, spreadsheets, graphics, and so on) can be accessed by different computers using various applications. The simplest, most universal form of generic data is plain text. There are several variations of text formatting, though. The Mac Operating System does not want a line feed (an instruction to start on a new line) after each return, while line feeds are required for DOS computers. Some computers require a return to be sent at the end of each line, while other computers prefer returns only at the end of each paragraph.

It's fairly easy to adapt between different formats. Most Mac word processors can read plain text files and include a Save As command to save plain text files, with or without carriage returns. White Knight's Filters command (**FE**) automatically strips extraneous line feeds following returns. When sending text files to DOS

computers, White Knight can automatically send a line feed after each return via its Key Mapping dialog (**OM**).

If you receive a DOS text file that has embedded line feeds, they will show as blank (box) characters in most fonts. They can easily be removed by using a word processor's find-and-replace function to delete every control-J (line feed) character.

Other types of data can be shared between different platforms. Many Mac programs are intelligent enough to read foreign file formats (for example, Excel can read Lotus 1-2-3 files). Programs on other computers may have the ability to save files in a Mac-compatible format. In addition there are transportable formats that can be used by a variety of computers. TIFF (tagged-image file format) and GIF (CompuServe's Graphic Interchange Format) graphics can be created and read by a variety of computers. These files should be transmitted directly from computer to computer without any translations or filters.

The Phone Book

With earlier versions of Red Ryder you had to enter the AT command ATDT before dialing each phone number. With White Knight, just enter a phone number and the modem should respond appropriately. However, when using White Knight's phone book you still need to enter a modem-dialing command before each saved phone number you enter in the phone book. Don't forget to include prefixes needed for outside lines, pauses to wait for dial tones, or codes for features such as disabling call waiting.

If you've got a valuable White Knight tip, share it with other *Macworld* readers by sending it to *Quick Tips*, *Macworld*, 501 Second St., San Francisco, CA 94107. **m**

Author PHILIP CHIEN has used Macs since the original Lisa, and has been modeming since 1979. He is currently writing a book on telecommunications.



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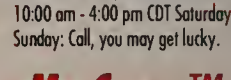


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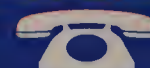
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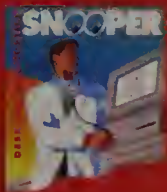
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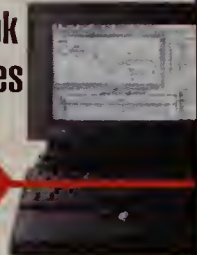
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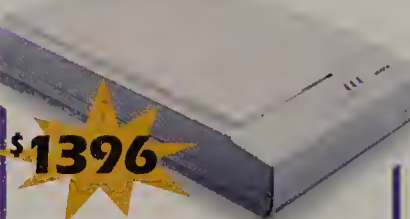
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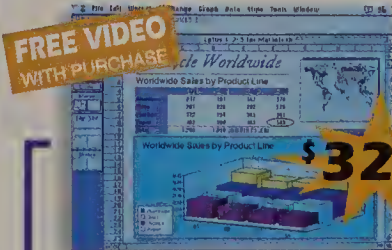
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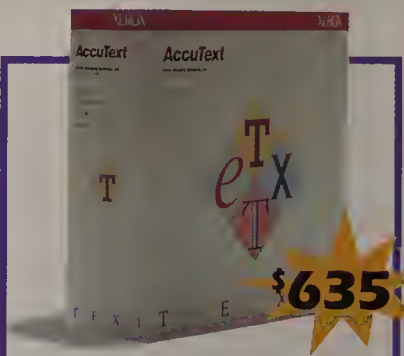
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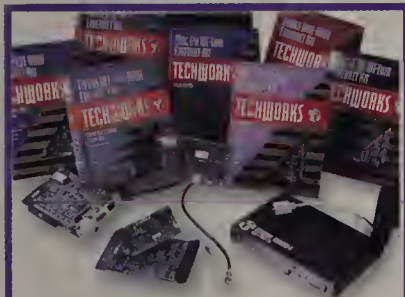


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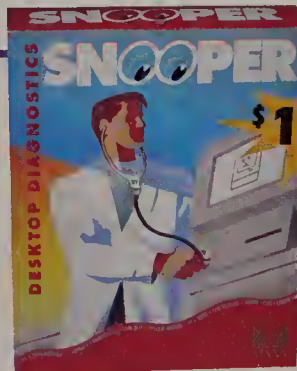
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The ETC Repeater is an economic and easy solution to expand your ethernet network. The ETC Repeater provides two BNC ports for connection to two thin-ethernet segments, IEEE 802.3 10 Base2 Thinnet standard, full multi-port functions, four LEDs indicate both segments' reception and transmission status and supports a maximum of five segments with a network length of 3035 feet, via four repeaters.



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\$99

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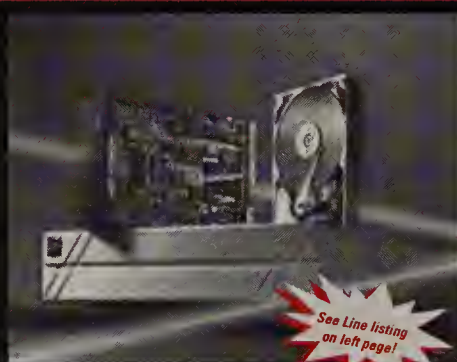
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ETCTM Tools

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See Line listing on left page!

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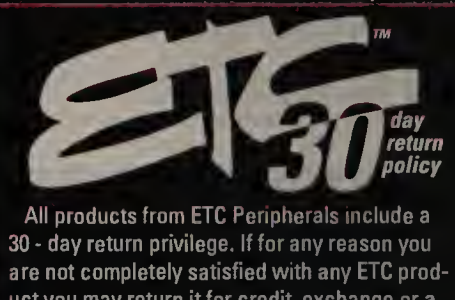
The ETC LAN Adapter is an external connection that allows IBM and IBM compatibles access to Macintosh Ethernet Thin or 10BaseT networks.



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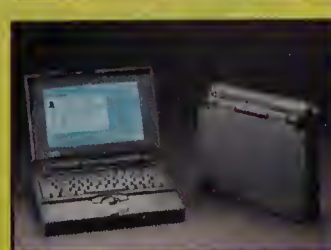
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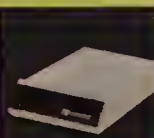
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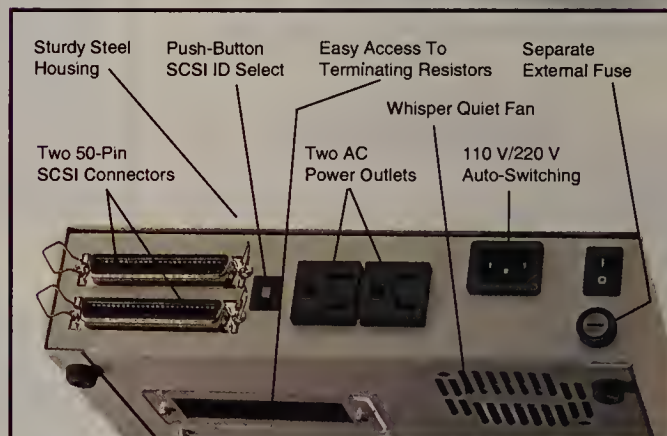


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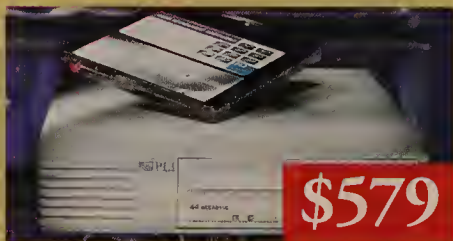
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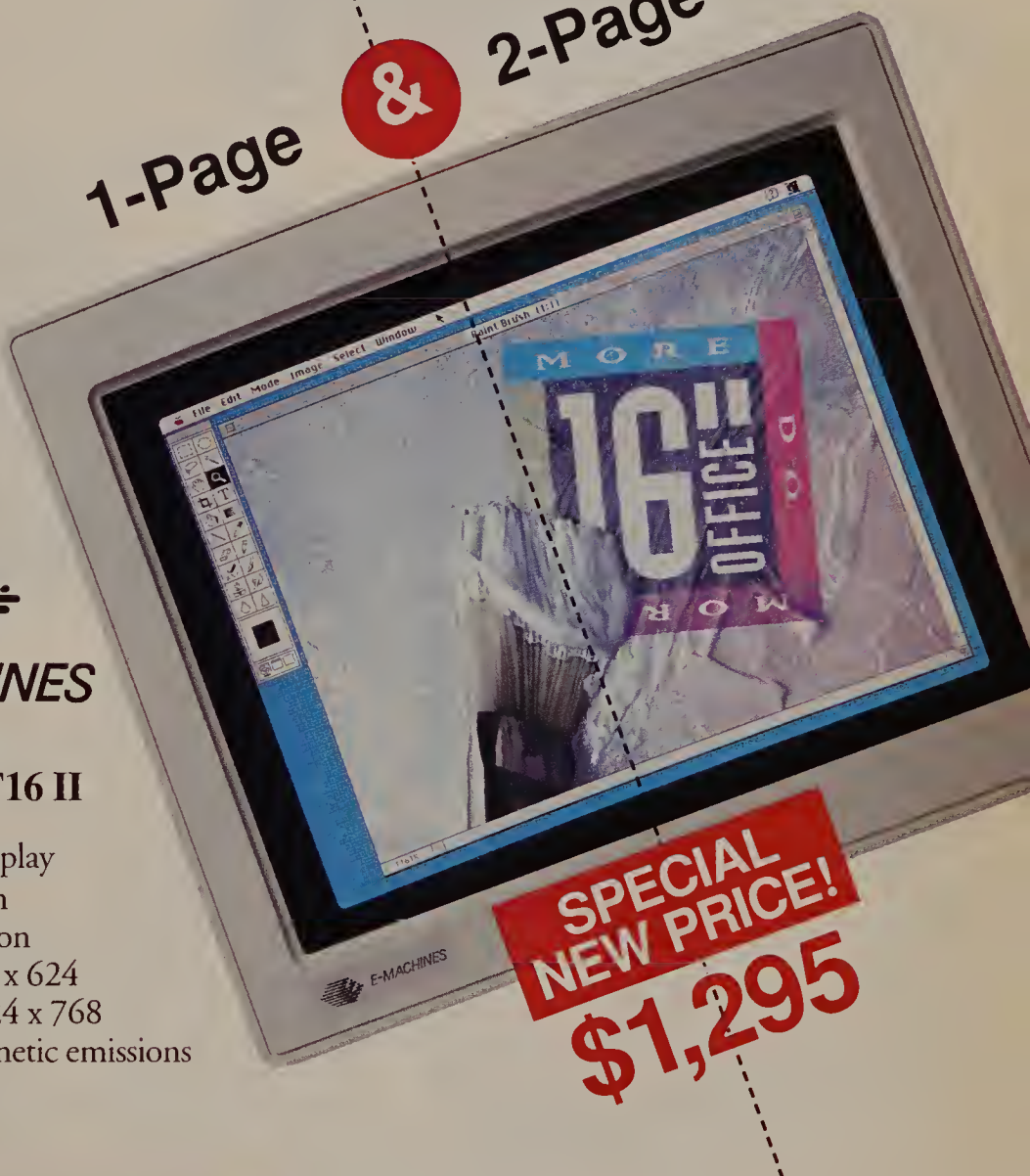
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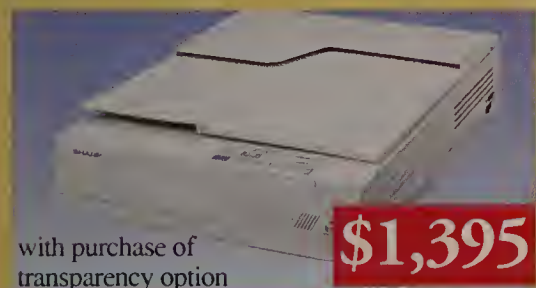


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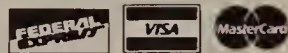
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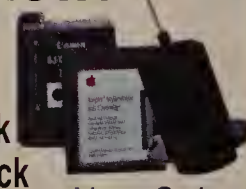
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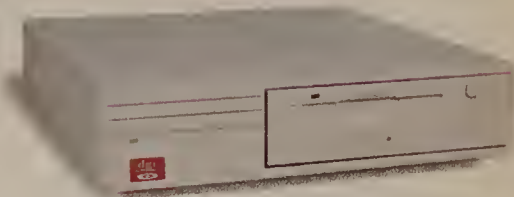
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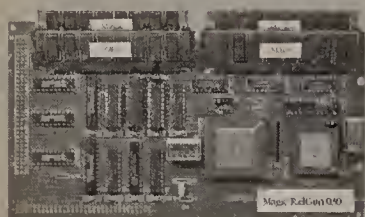
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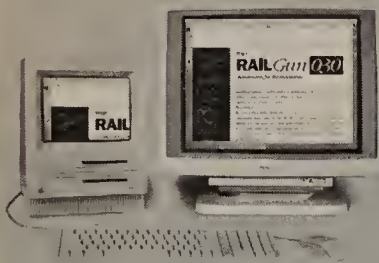
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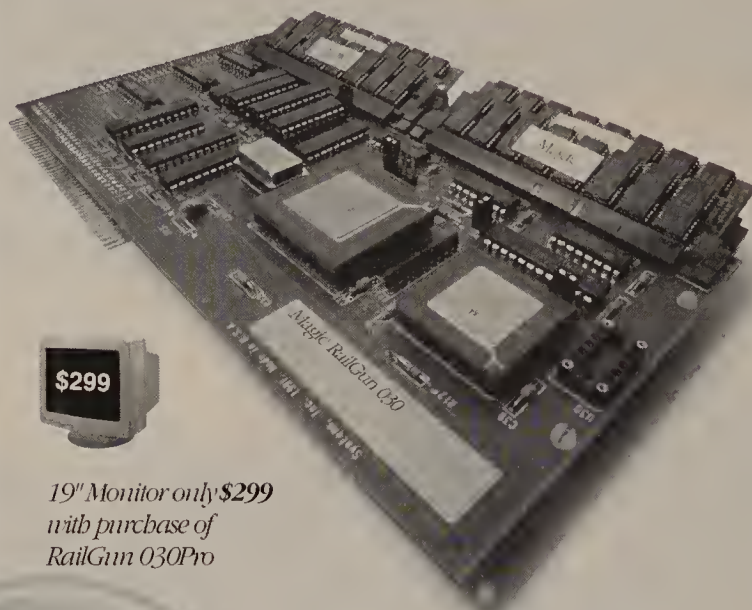


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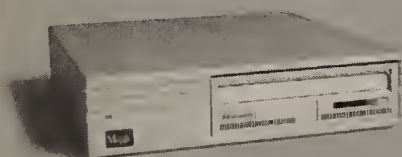
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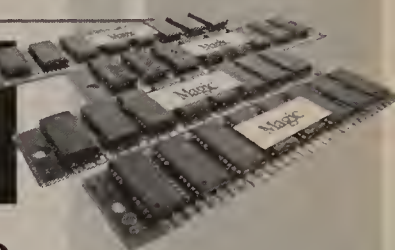
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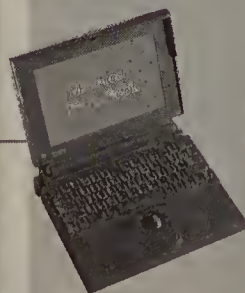
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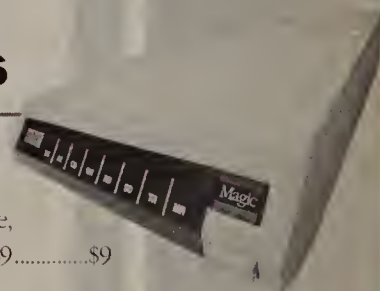
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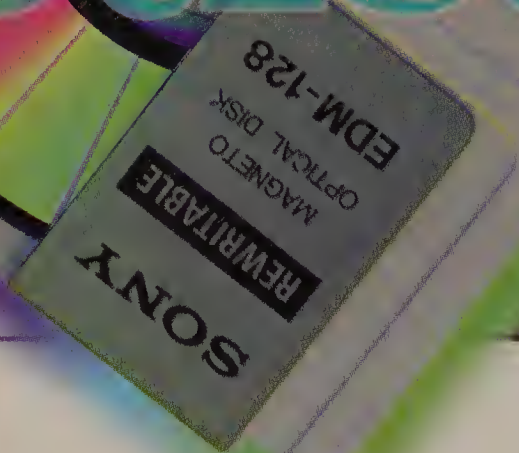
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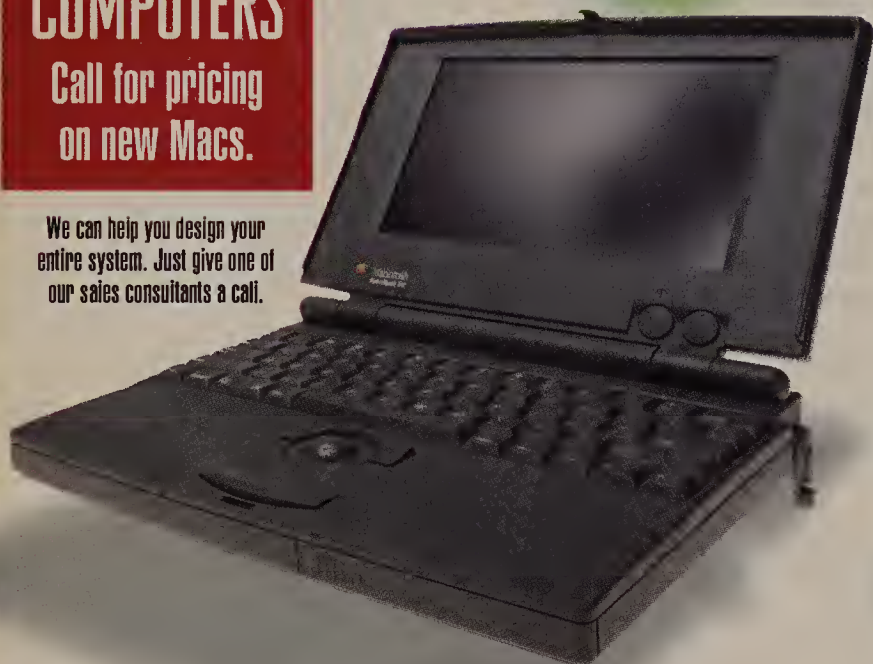
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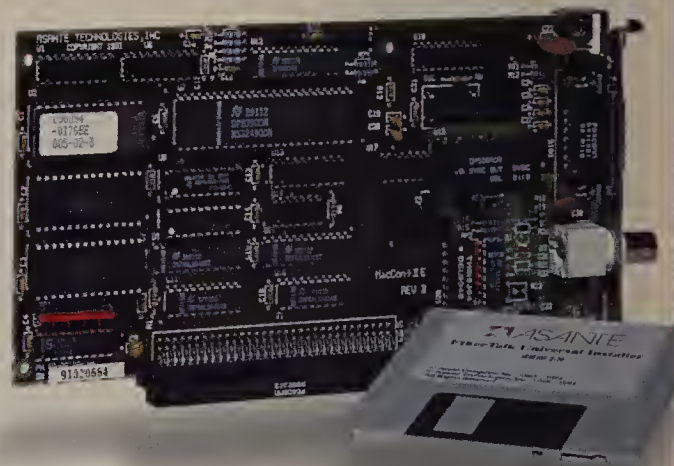
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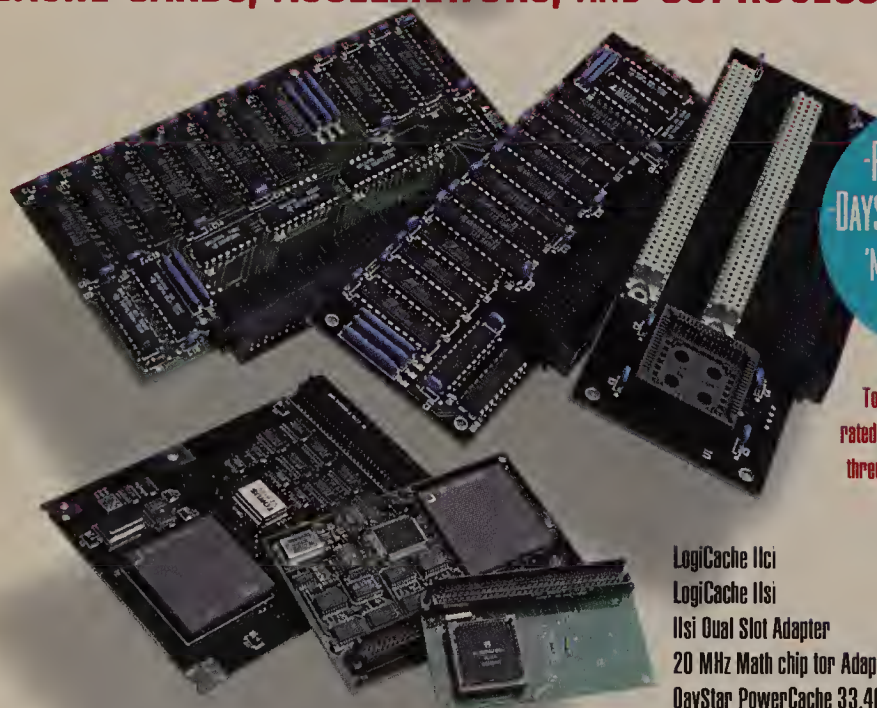
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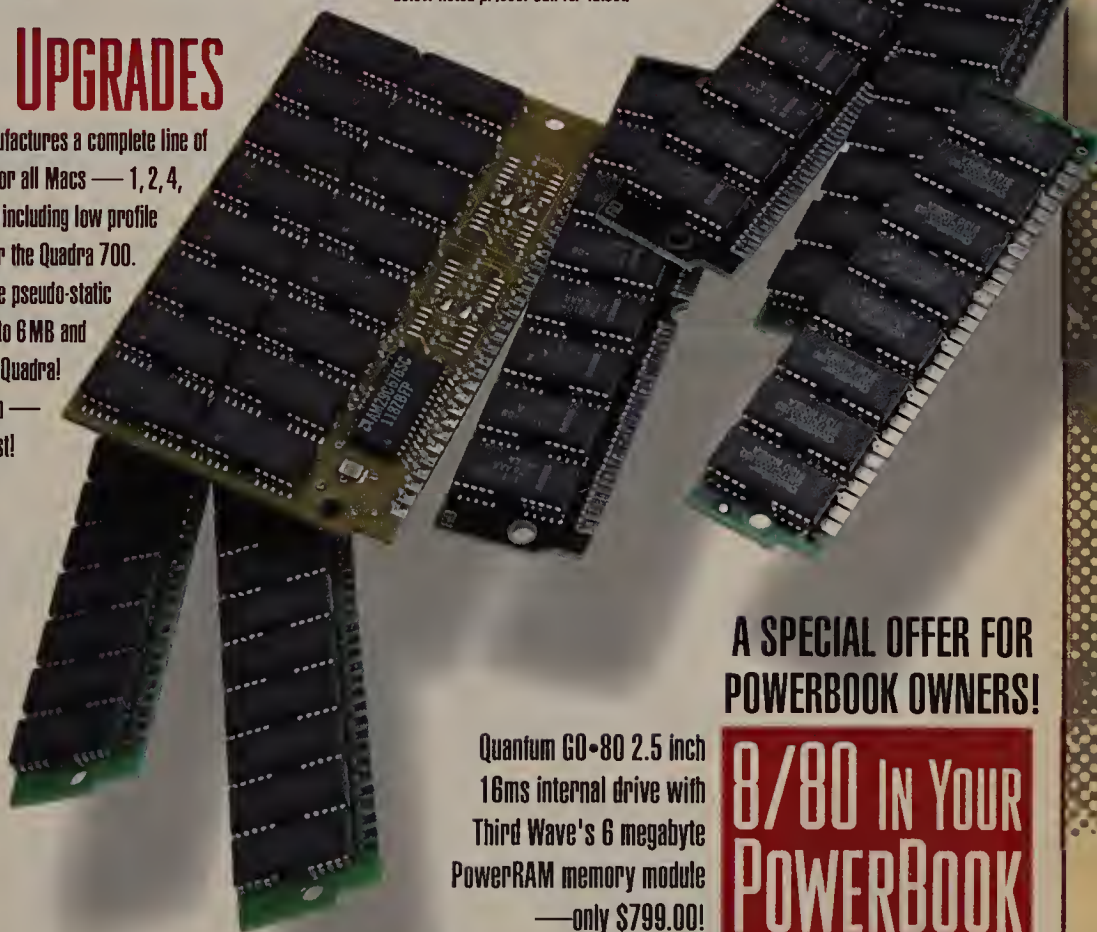
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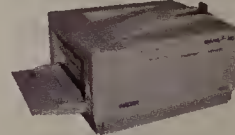
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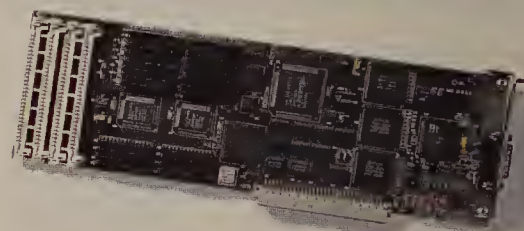
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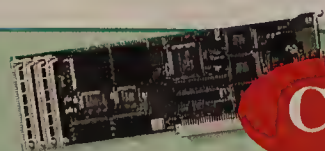
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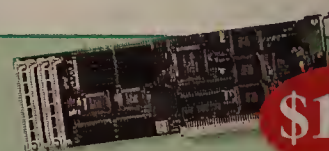


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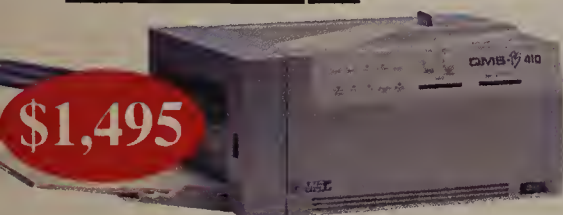
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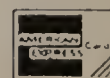
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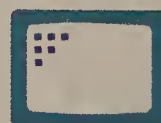
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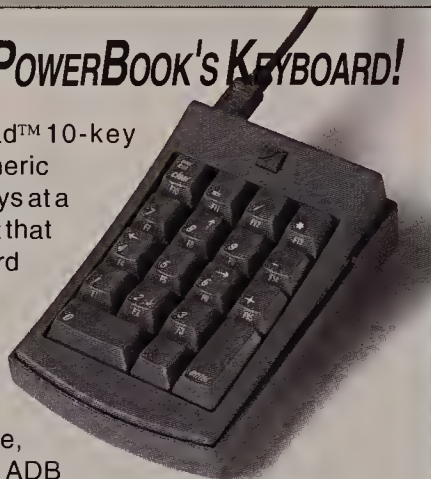
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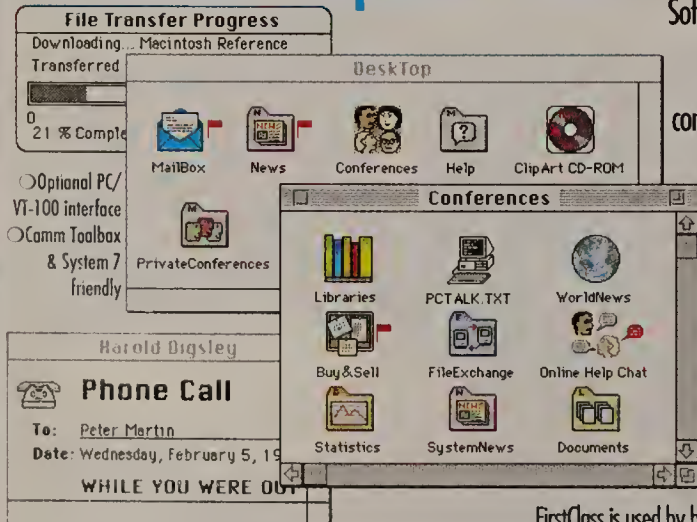
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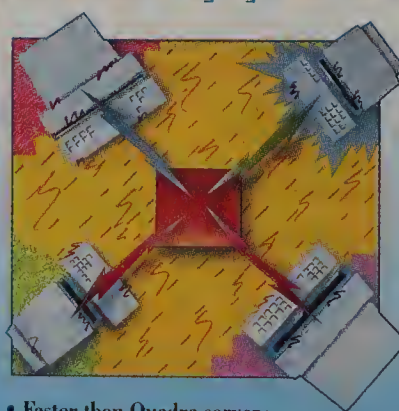
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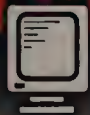
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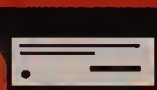
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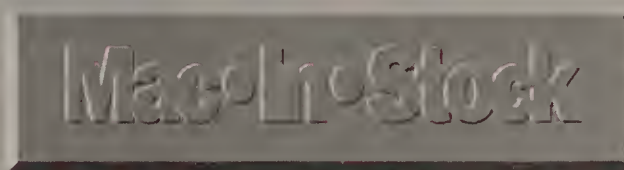
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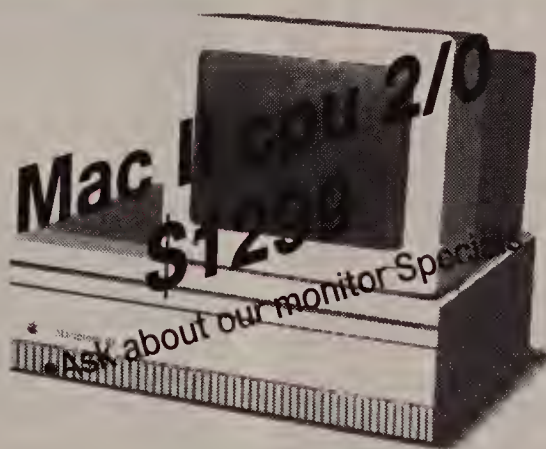
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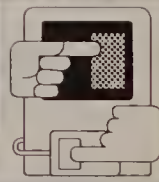
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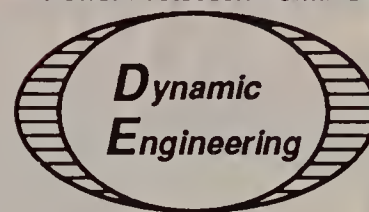
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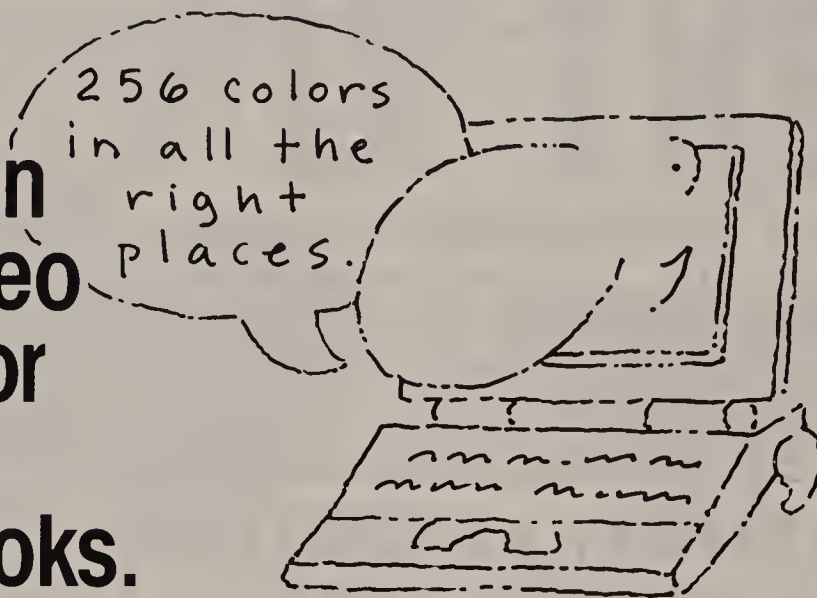
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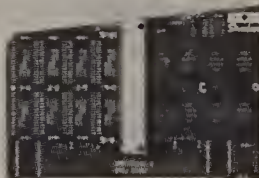
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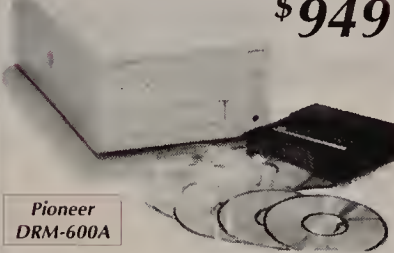
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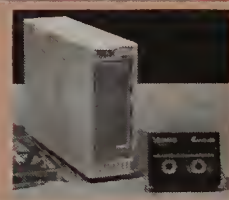
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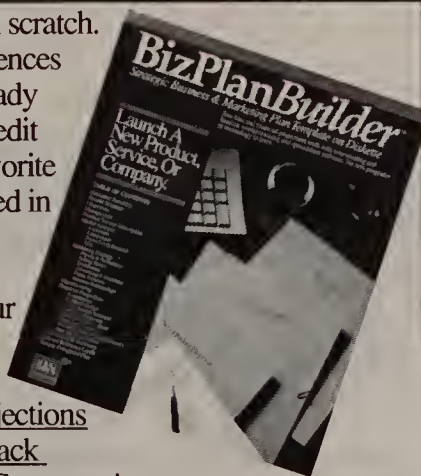
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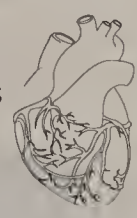
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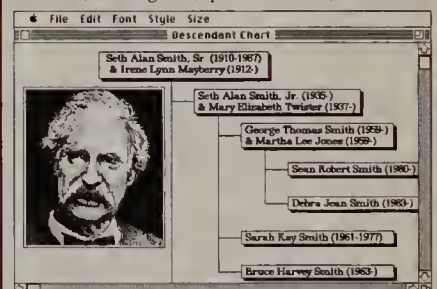
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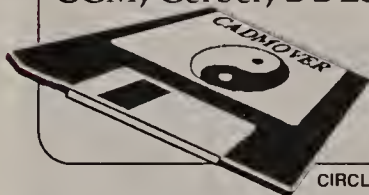
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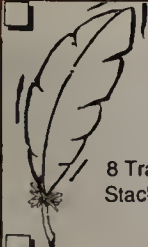
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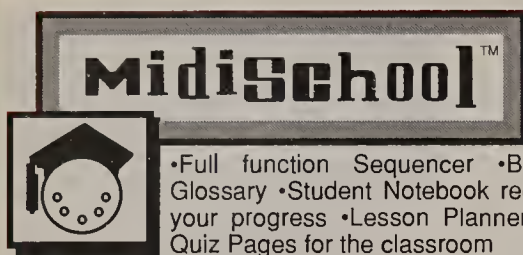
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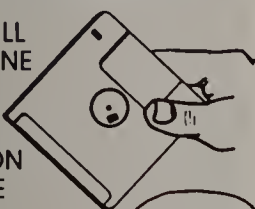
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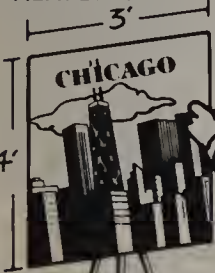
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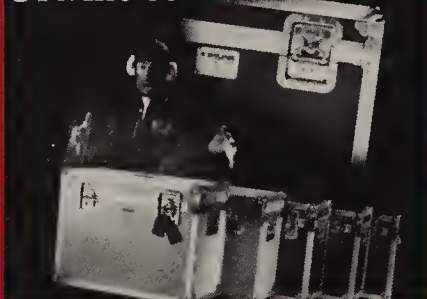
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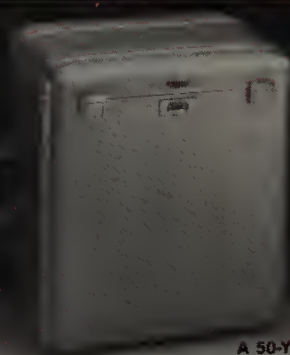


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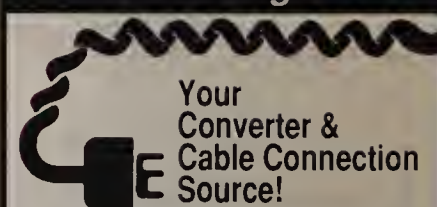
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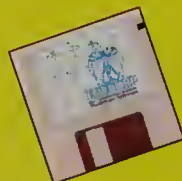


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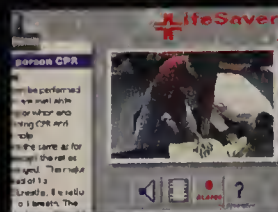
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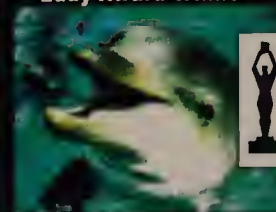
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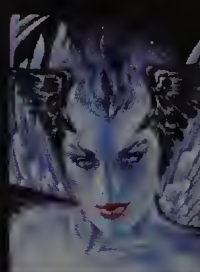
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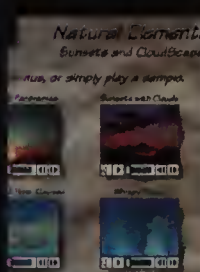
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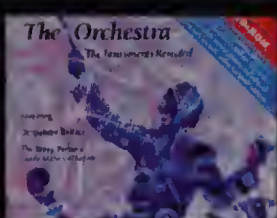
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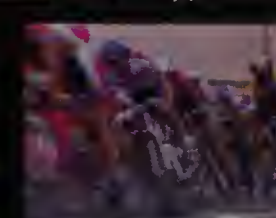
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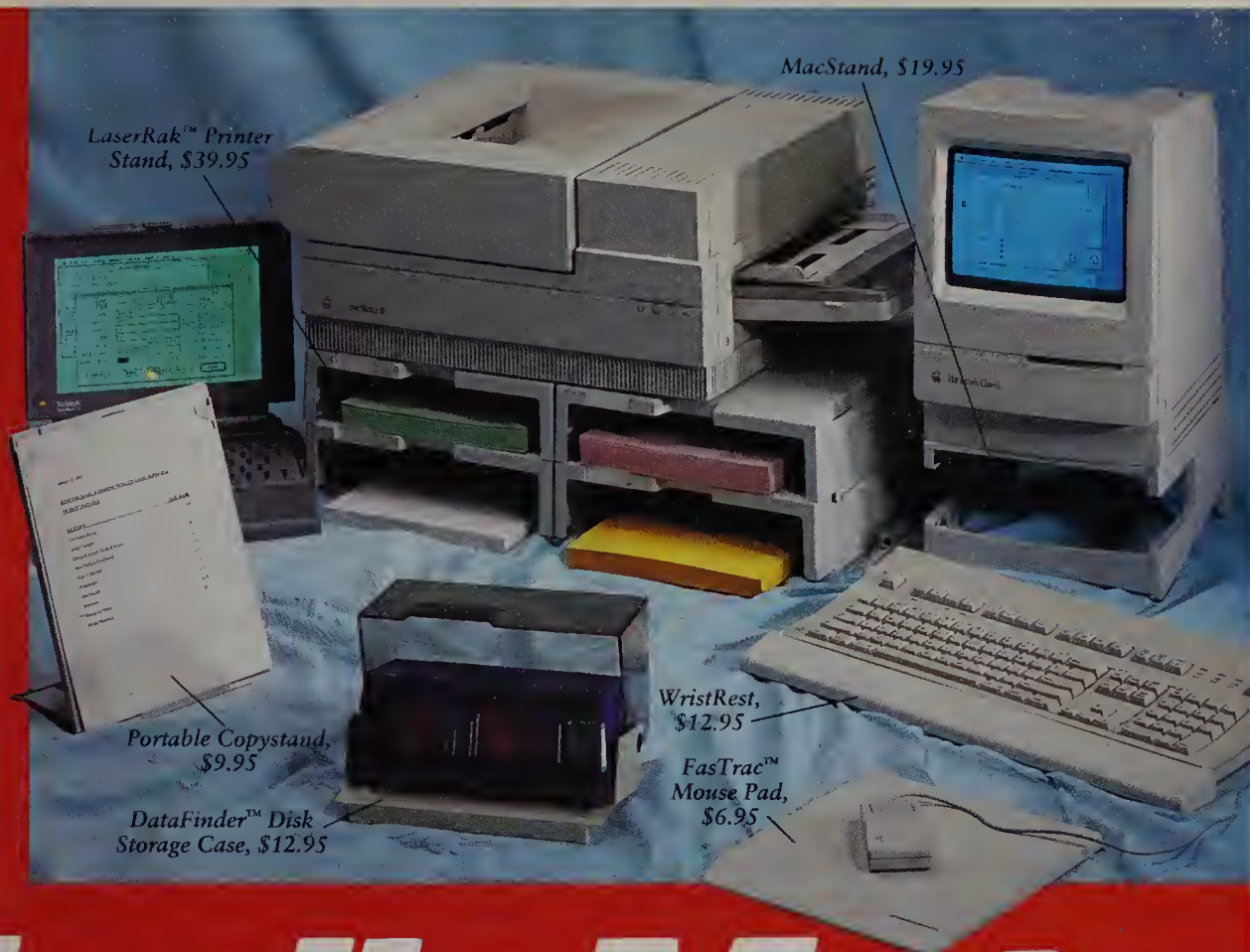
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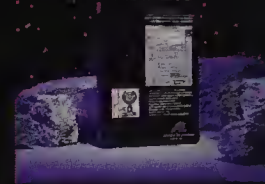
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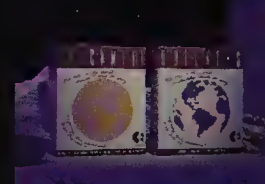
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Upgrade to QuickKeys for only \$49. Call 1-800-523-7638, Dept. CE203. (Expires 7-31-92)



GreatWorks
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The Norton Utilities for the Mac 2.0
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AutoDoubler and DiskDoubler
by Salient Software



Effects Specialist and Layouts
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by WordPerfect Corp.

Official "Blast Off" Sweepstakes Rules
No purchase necessary to win. Simply mail the complete advertisement to "Blast Off" Sweepstakes, PO BOX 20426, San Jose, CA 95160. All entries must be postmarked by September 30, 1992. All entries become the property of Merisel and will not be returned. No photocopied or mechanically reproduced or duplicate entries will be accepted. 2. Winner will be determined by a random drawing to be held on or about October 7, 1992 by Merisel. One name will be drawn. All decisions are final. Odds of winning will be determined by the number of completed entries received. By participating, the winner consents of use of his/her name and/or likenesses for publicity purposes, without additional compensation. Winners may be required to sign and return (within 10 days of notification mailed) an affidavit of eligibility and liability/publicity release. Failure to comply with this condition in time stated may result in forfeiture. 3. Offer good only to residents 18 years of age or older, except employees and their families of Merisel/Macamerica, its affiliates, subsidiaries, advertising, promotion, and fulfillment agencies. Void where prohibited by law. Taxes are the sole responsibility of the winners. All federal, state and local laws and regulations apply. 4. For a list of prize winners, send a self-addressed stamped envelope by October 31, 1992, to "Blast Off" Sweepstakes, PO BOX 20426, San Jose, CA 95160. While supplies last. Prices are subject to change without notice. All trademarks and registered trademarks are of their respective companies. © 1992 Merisel, Inc. All rights reserved.

Never again worry about computer theft or damage

What could be better than full replacement?

By now, you've probably heard or read about SAFEWARE® Insurance for microcomputers. But you may still wonder just what it protects, or whether it's really worth the investment. If you've never lost any part of your computer system or software, you probably don't yet realize the limitations of most standard insurance coverages. Or the agonies you could face in trying to recover even the simplest piece of peripheral equipment.

What do you mean it's not covered?!

Operating your computer system without SAFEWARE protection is fine as long as you don't have to worry about an accident or loss. But what if you came to your office one morning to find you'd been robbed? Or your home had been ransacked? Or that a pipe had burst and caused water damage? Or that your system, too, had fallen victim to a leading destroyer of micro-systems—a power surge? All events beyond your control. If something like this should happen to you, you're likely to find out the hard way just how limited your standard insurance policy's protection really is. And no matter how little or how much you have invested in your computer system, discovering that it's not covered can be an expensive lesson.

Now you can be sure

SAFEWARE was developed by an insurance professional who was shocked to learn that his very own personal computer was at risk. Can you imagine? What he discovered was that his homeowners insurance policy excluded coverage as soon as he began operating his first business program. Even his simplest spreadsheet voided coverage. Because most homeowners policies won't cover any equipment used for business, no matter how infrequently. Out of this need was born SAFEWARE. A simple, easy-to-understand coverage you can count on. Full replacement coverage of hardware, media and purchased software, after a low \$50 deductible.

With SAFEWARE there's no need for you to schedule equipment or software as you do with the "rider" type of policies. So your coverage can grow with your system, providing protection for its full value rather than for each individual item. This will be especially impor-

tant to you if you're ever planning to buy additional equipment or software. Even just one peripheral.

What the editors reported

Publication editors have discovered the news about SAFEWARE and have reported to their readers.

Computer Decisions: . . . "Your personal computer might not be safe at home. If it is not insured, then you're running the risk of losing the thousands of dollars you've invested . . ."

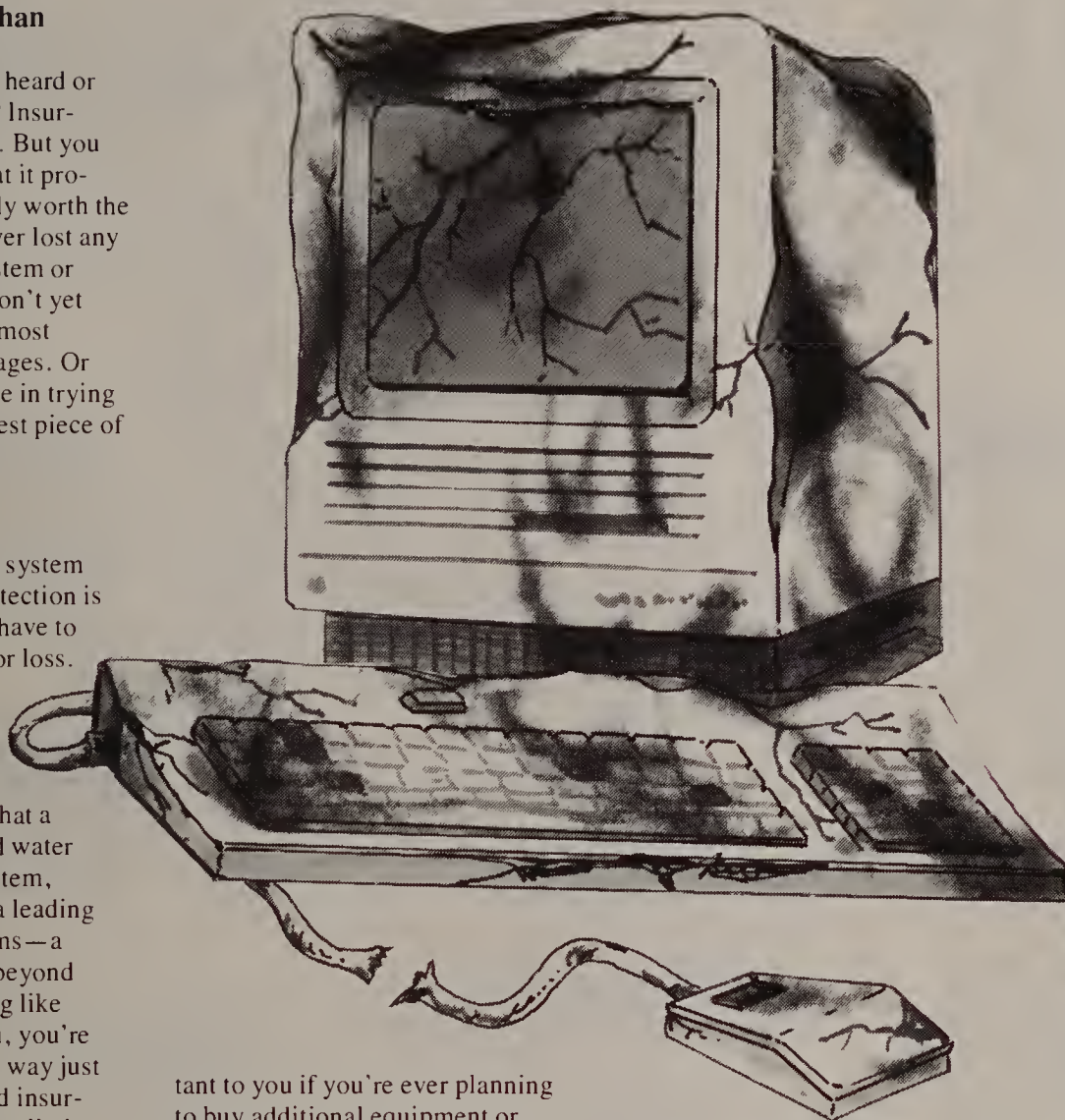
Personal Computing: . . . "Replacing hardware may be more of a problem than you thought it would be . . . That's why (a computer consultant) suggests that you get the computer insured."

Wall Street Journal: . . .

"[SAFEWARE] introduces coverage that insures home computers regardless of use. The usual premium: about \$75 a year."

No risk offer

SAFEWARE is a comprehensive plan of insurance, which means that it covers *all* hardware, *all* purchased software, and *all* media. Your complete system is protected against theft, fire, accidental damage. SAFEWARE even covers damage caused by power surges . . . the leading destroyer of microcomputers.



And, now, SAFEWARE is available on a *no risk* basis. If you are not completely satisfied with the protection afforded by SAFEWARE, you may return the contract for a full refund within the first 10 days after you've received it.

Thousands have said "yes!"

Since it was first introduced in 1982, thousands of computer owners, like you, have said "yes" to the SAFEWARE offer. Owners of systems from the smallest portable micros to larger sophisticated business systems are finding that SAFEWARE offers the most affordable and complete security. And the simplest peace of mind available to ensure carefree computing.

The cost: pennies a day

As you can see from the table, the annual premium for a typical system consisting of a \$2,000 processor, a disk drive and printer worth \$2100, and \$900 in software, is just \$69. And you can save even more since the cost of insurance for personal computers used for business may be tax deductible. To determine your rate of coverage, just add up your total system value. Then, find the premium in the table.

Easy to order

Choose from three simple ways to pay for your complete SAFEWARE protection: Call the toll-free phone number listed and we'll charge your premium to your VISA or MasterCard. Or, you can mail us the coupon below along with your check. Or, send us the coupon and charge to your credit card.

Total Hardware, Media & Software System Value	Annual Premium
Up to \$ 2,000	\$ 49
\$ 2,001-\$ 5,000	\$ 69
\$ 5,001-\$ 8,000	\$ 89
\$ 8,001-\$11,000	\$109
\$11,001-\$14,000	\$129
Call toll-free for rates on higher coverages	

It is an underwriting requirement that you insure your system for full replacement cost.

800-848-3469

Phones open 8 a.m. to 10 p.m. Eastern Time Monday through Friday
9 a.m. to 5 p.m. Saturday



SAFEWARE, The Insurance Agency Inc.
2929 N. High St.
P.O. Box 02211
Columbus, OH 43202

With SAFEWARE you get...

- Full replacement coverage.
- Freedom from worries of fire, theft or accident.
- Ultimate in power surge protection.
- Costs as low as \$49 a year.

Yes, my computer needs immediate protection. Please issue my SAFEWARE Insurance Policy.

Name _____

Street _____

City _____

State _____ Zip _____

Phone _____

Total System Value \$ _____

☐ Check Enclosed ☐ VISA

☐ MasterCard

Card # _____

Exp. Date _____

Sign here _____

No risk. You may return contract for full refund within 10 days. Coverages and limits are subject to the terms, conditions and exclusions in the policy. Offer differs in Texas and Kansas. Void where prohibited.

Mail to: SAFEWARE:
2929 N. High St.
P.O. Box 02211
Columbus, OH 43202

T-MW

Best-Sellers

AUGUST 1992

Months on chart
▼ Last month
▼ This month

Business Software

87	2	1	Microsoft Word <i>Microsoft Corporation</i>
9	3	2	Microsoft Office <i>Microsoft Corporation</i>
78	1	3	Microsoft Excel <i>Microsoft Corporation</i>
65	11	4	Microsoft Works <i>Microsoft Corporation</i>
39	14	5	FileMaker Pro <i>Claris Corporation</i>
25	5	6	Quicken <i>Intuit</i>
8	4	7	MacDraw Pro <i>Claris Corporation</i>
—	—	8	ClarisWorks <i>Claris Corporation</i>
74	8	9	Aldus PageMaker <i>Aldus Corporation</i>
63	10	10	MacWrite II <i>Claris Corporation</i>
27	—	11	Adobe Illustrator <i>Adobe Corporation</i>
39	6	12	WordPerfect for the Macintosh <i>WordPerfect Corporation</i>
18	—	13	MacProject <i>Claris Corporation</i>
2	7	14*	1-2-3 for Macintosh <i>Lotus Development Corporation</i>
8	9	14*	Aldus Persuasion <i>Aldus Corporation</i>

Education Software

54	2	1	Reader Rabbit <i>The Learning Company</i>
21	5	2	Where in Time Is Carmen Sandiego? <i>Broderbund Software</i>
40	1	3	Where in the World Is Carmen Sandiego? <i>Broderbund Software</i>
65	3	4	Math Blaster <i>Davidson & Associates</i>
25	—	5	Where in the USA Is Carmen Sandiego? <i>Broderbund Software</i>

* tie

Months on chart
▼ Last month
▼ This month

Entertainment Software

52	3	1	Microsoft Flight Simulator <i>Microsoft Corporation</i>
31	2	2	SimCity <i>Maxis</i>
30	5	3	Falcon <i>Spectrum HoloByte</i>
27	1	4	Tetris <i>Spectrum HoloByte</i>
16	4	5	Crystal Quest <i>Casady & Greene</i>

Network/Data Communications

33	1	1	PhoneNet <i>Farallon Computing</i>
56	2	2	AppleShare <i>Apple Computer</i>
2	4	3	AppleTalk Remote Access <i>Apple Computer</i>
19	3	4	MacLink Plus <i>DataViz</i>
18	5	5	White Knight II <i>FreeSoft Corporation</i>

Add-In Boards

16	1	1	Macintosh IIx NuBus Adapter Card <i>Apple Computer</i>
20	2	2	Macintosh Display Card 8•24 <i>Apple Computer</i>
17	—	3	Radius TPD Interface <i>Radius</i>
2	3	4	Macintosh II FDHD Upgrade <i>Apple Computer</i>
17	4	5	Pivot <i>Radius</i>

Months on chart
▼ Last month
▼ This month

Utility Software

15	1	1	After Dark <i>Berkeley Systems</i>
26	2	2	SAM <i>Symantec Corporation</i>
16	4	3	Virex <i>Microcom</i>
21	5	4	Norton Utilities for Macintosh <i>Symantec Corporation</i>
5	3	5	More After Dark <i>Berkeley Systems</i>

The AmCoEx Index of Used Mac Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac Plus/1MB/none	\$350	\$ 0
Mac Plus/2MB/20MB	\$500	-\$ 50
Mac SE/2MB/20MB	\$875	+\$ 25
Mac Portable/1MB/40MB	\$1150	-\$ 50
Mac Classic/2MB/40MB	\$800	\$ 0
Mac SE/30/2MB/40MB	\$1650	-\$ 25
Mac LC/2MB/40MB	\$1050	-\$ 50
Mac II/4MB/40MB	\$1850	+\$ 50
Mac IIx/3MB/40MB	\$1900	\$ 0
Mac IIcx/4MB/80MB	\$2475	+\$150
Mac IIci/4MB/80MB	\$3100	+\$100
Mac IIfx/4MB/80MB	\$4000	\$ 0
Apple 12-inch B&W display/board	\$250	\$ 0
Apple 13-inch RGB display/board	\$650	-\$ 25
LaserWriter Plus	\$1050	-\$ 50
LaserWriter IINT	\$1750	\$ 0

Index provided by the American Computer Exchange of Atlanta, Georgia. It reflects sales during week of May 26. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during April 1992.

If You Think You Already Know About Mirror Peripherals...

"We thought the Mirror ProView/24, a 20-inch Trinitron, with excellent software, was a real bargain."

"...razor-sharp standout."
MacUser, May 1991

★★★★½

"For a good deal...check out the Mirror ProView/8."
MacWorld, October 1991

"...our performance leader, the Mirror CD-ROM."

"...excellent performance, solid construction, and convenient features..."

"...the fastest drive."
MacUser, June 1991

★★★★½

"...the quality of the hardware is excellent. The Mirror Scanner comes competitively priced."
MacUser, December 1991

"...excellent features at a very competitive price."
MacWeek, January 27, 1992

"Fast and accurate; inexpensive."

"...the Mirror 600 the best value around."
MacWorld, April 1992

MW ★★★★★

MW
EDITORS'
CHOICE

"Editor's Choice. The overall best buy is the Mirror 210 hard drive."

"Fast and inexpensive, this 210 MB drive has some of the best documentation, disk utilities and public domain software..."
MacWorld, February 1992

"...[Mirror] offers better support... you'll get more with the Mirror 210."
MacUser, April 1992

★★★★

"...an excellent combination of value, speed, service and package. The Mirror 105 is inexpensive, well-packaged...with good service and warranty."
MacUser, November 1991

★★★★

MW
EDITORS'
CHOICE

The Mirror 1 GB Hard Drive "Includes excellent software."
MacWorld, May 1992



- RISC processor and genuine Adobe PostScript Level 2, for fast printing of even complex documents.
- 35 Adobe fonts built in and SCSI port for connecting font drives.
- 2 MB of RAM, upgradable to 10 MB.
- Installation videotape makes setup a snap.

- Connect Macs and PCs simultaneously. Automatic switching between three interface ports (AppleTalk, parallel and serial).
- Long-life consumables for very low cost-per-page.

- Mirror quality built in.

- 300 dpi, 9 pages-per-minute print engine.

- One large capacity paper tray (holds 250 sheets) and manual feed.

- Add an optional second paper tray for ultimate convenience. Our easy to use tray selector software lets you keep letterhead and plain paper loaded all the time. No more running to the printer to switch trays.



MirrorImage 309

\$1,699

...Then You Haven't

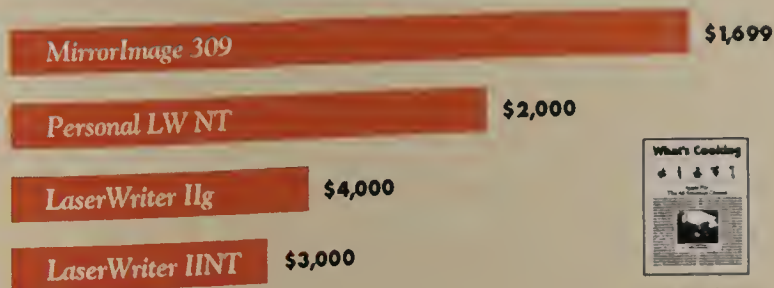
Introducing the MirrorImage™ Laser Printers.
High performance you can afford.

Mirror's philosophy is simple: build high quality products and sell them at a great price. No product illustrates this better than the new MirrorImage Laser Printers. Both the MirrorImage 309 and the MirrorImage 415 give you more features, more function-

ality and higher performance than printers costing hundreds or thousands more.

We started with the state-of-the-art Wietek RISC processor, for the best possible throughput. Then we added Adobe's PostScript 2 to print even complex documents effortlessly. We chose high speed print engines that deliver hundreds of thousands of pages at the low cost-per-page. And because you don't have time to waste, we designed the most flexible and convenient paper handling of any laser printer. Our optional second paper tray and Mirror's sophisticated tray selector software help eliminate those trips to the printer to change trays! Both printers come with 35 genuine Adobe typefaces, and a built in SCSI port so you can add a hard drive for convenient storage of hundreds of fonts. The MirrorImage Laser Printers are perfect for mixed comp-

LASER PRINTER PRICE/PERFORMANCE RATIO



our test page

We measured the average time to print our Quark Xpress test page from a PowerBook 140 connected directly to each printer. All printers were in stock configurations, with no font drives or additional memory. The performance index was calculated by taking the inverse of (street price/inverse of print time).

- The smallest 11 x 17 printer available. True 400 dpi resolution and a rugged 15 pages-per-minute print engine.

- Automatic switching between three interface ports (AppleTalk, parallel and serial).

- 4 MB of RAM, upgradable to 16 MB.

- RISC processor and genuine Adobe PostScript Level 2; handles the toughest jobs with ease. Your work will look great and print fast.

- 35 Adobe fonts built in, plus SCSI port for connecting font drives.



- Manual feed tray

- Two high capacity paper trays. Easy to use tray selector software lets you keep tabloid and letter size paper loaded all the time.

MirrorImage 415

\$4,499

Seen The Fine Print.

ing environments; the three interface ports (AppleTalk, serial and parallel) can be active simultaneously so you can hook up Macs and PCs to the same printer.

The MirrorImage printers are easy to afford, easy to set up and easy to live with. We even include an installation videotape that guides you, step by step through the setup.

The MirrorImage 309 is a 300 dpi, 9 pages-per-minute printer for letter or legal size paper. It comes with 4 MB of RAM, upgradable to 10 MB, for faster printing of extremely complex documents. The MirrorImage 309 is an outstanding value for only \$1,699.

The MirrorImage 415 has all the features of the 309, plus 11x17 paper capacity, true 400 dpi printing (horizontal and vertical) and a heavy duty 15 pages-per-minute print engine. Priced at only \$4,499, the

MirrorImage 415 is the smallest tabloid size printer available, so it fits small offices as well as small budgets.

And of course, both MirrorImage printers come with our 30-day "Love it or return it guarantee*", and they are backed by Mirror, famous for outstanding customer service.

Call today, and you could be printing faster tomorrow.

MIRROR

1-800-654-5294

ORDER DIRECT

MEDIA:1017

Circle 125 on reader service card

*less cost of consumables; you pay shipping fees.

File

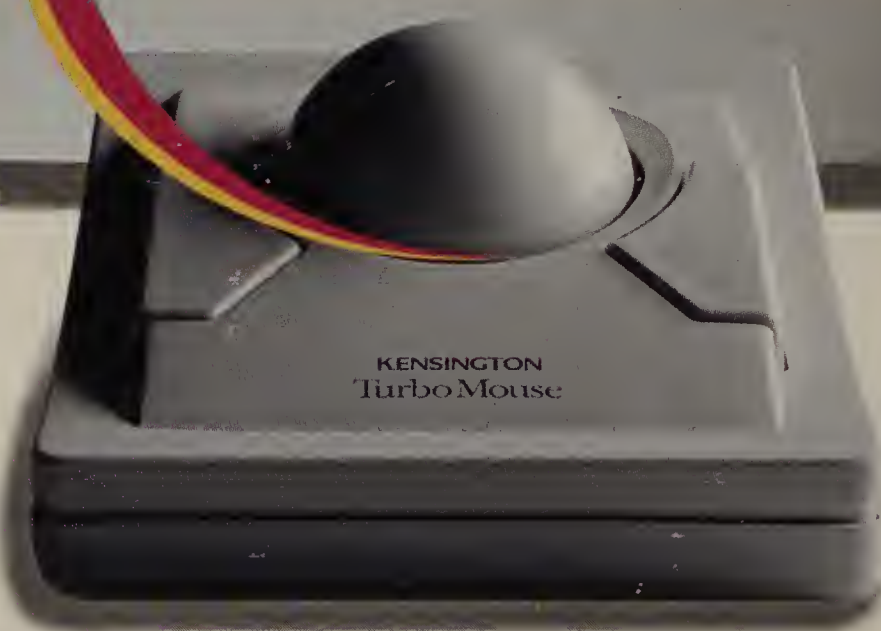
It
won't
hop.

Edit

It won't skip.

Chooser

But wait till you
see it jump.



While the cursor may hop or skip with some trackballs, Turbo Mouse® has always been known for its ultrasmooth movement.

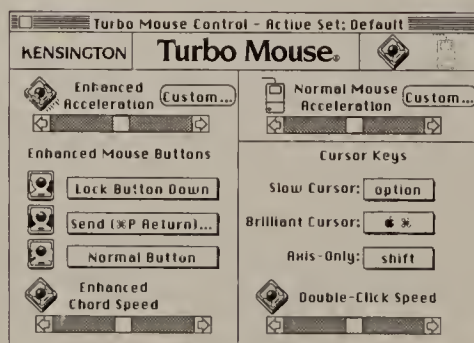
Now, the latest version of Turbo Mouse is known for something else—jumping. Our new Brilliant Cursor technology makes it possible.

With it, you can move the cursor instantly to predefined HotSpots on the screen, such as the File and Edit menus and the Trash icon.

First, you define your HotSpots. Then, click a button and move the ball in the direction you want to go. The cursor automatically jumps to the predefined HotSpot. You can even program in different HotSpots for different applications and for different users.

And Brilliant Cursor technology is not all that's new with Turbo Mouse 4.0. Also new is advanced acceleration with three levels of control and Enhanced Mouse Buttons that let you execute

With the all new Brilliant Cursor™ technology,
you can actually make the cursor jump
to any spot on the screen.



one of seven programmable commands. For example, send a Print command with just one click using Send String. Or move the cursor with ultra precision using Slow Cursor. Even save different combinations of commands for each of your favorite programs.

Then there's the award winning Turbo Mouse hardware. Hardware that has won more awards than any other input device. Hardware that has consistently been voted "Best Input Device" by Macintosh users worldwide. Features include a large comfortable ball, "easy-click" buttons, long-lasting precision

stainless steel bearings, and two ADB ports for chaining other devices.

Turbo Mouse 4.0 is fully System 7.0 compatible. To receive information by fax, including upgrade information, call 800-535-4242, dial 82 and request document 320. For general information, call 800-535-4242. Outside the US, 415-572-2700.

See us at MacWorld Expo, Booth #5328 in the World Trade Center.

KENSINGTON

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